



Research-Based Web Design & Usability Guidelines



Sanjay J. Koyani, Robert W. Bailey,
Janke R. Nall

with

Susan Allison, Conrad Mulligan,
Kent Bailey, and Mark Tolson

Forewords by:

Tommy G. Thompson
Secretary of Health and Human Services

Ben Shneiderman
Professor of Computer Science, University of Maryland



**Communication
Technologies branch**
OFFICE OF COMMUNICATIONS
NATIONAL CANCER INSTITUTE

Foreword—Secretary Thompson

These Research-Based Web Design & Usability

Guidelines are an excellent example of how we can quickly and effectively respond to the President's Management Agenda and his E-government Act of 2002. The National Cancer Institute's Communication Technologies Branch in the U.S. Department of Health and Human Services (HHS) anticipated that all federal agencies would need such information and began the ambitious process of producing these research-based Guidelines.

Given the high level of Internet use by the public, there is a critical need for authoritative guidance in designing federal websites. The President's Management Agenda noted that the federal government is the world's largest single consumer of information technology (IT). A large portion of federal IT spending is devoted to Internet initiatives, which yield more than 35 million Web pages at more than 22,000 websites. More than sixty percent of all Internet users interact with government websites throughout the year, and they use the Internet to access government services 24 hours a day, seven days a week.

Unfortunately, too many federal agencies have developed their websites according to their own needs, not the needs of the citizens they serve. For this and other reasons, the President's E-Government Act indicated that federal IT systems should be "citizen-centered." An important part of creating a citizen-centered website is the use of research on how citizens interact with websites. This book, which translates research into practical, easy-to-understand guidelines, helps those in charge of federal websites save time and valuable resources.

Because HHS offers high-quality information about health and human services, we felt it was essential that the HHS website – www.hhs.gov – meet the needs and expectations of all citizens who turn to us for help. Through "usability engineering" and these Guidelines, we have tested and redesigned our own site to reflect a citizen-centered approach.

I see these Guidelines as a wonderful resource for improving the communication capabilities of HHS, as well as all government agencies. I recommend that these Guidelines be used by all who deliver information and services to the American public.

– **Tommy G. Thompson**
Secretary of Health and Human Services
June 2003

Foreword—Professor Shneiderman

Background

These new NCI Web usability Guidelines carry

forward one of the most enduring success stories in user interface design. They continue the noble tradition of thoughtful practitioners who have hacked their way through the unruly design landscape and then distilled their experience into compact and generalizable aphorisms or patterns.

Compilations of such guidelines offer newcomers a clearer roadmap to follow, helping them to avoid some of the swamps and potholes. Guidelines serve experienced experts and busy managers by giving them an overview and reminding them of the wide range of issues. Most importantly, guidelines provoke discussions among designers and researchers about which guidelines are relevant and whether a refined or new guideline should be added.

Guidelines should be more than one person's lightly-considered opinion, but they are not rigid standards that can form the basis of a contract or a lawsuit. Guidelines are not a comprehensive academic theory that has strong predictive value, rather they should be prescriptive, in the sense that they prescribe practice with useful sets of DOs and DON'Ts. Guidelines should be presented with justifications and examples.

Like early mapmakers, the pioneering developers of user interface guidelines labored diligently. Working for IBM in the mid-1970s, Stephen Engel and Richard Granda recorded their insights in an influential document. Similarly, Sid Smith and Jane Mosier in the early 1980s, collected 944 guidelines in a 500-page volume (available online at <http://hcibib.org/sam/contents.html>). The design context in those days included aircraft cockpits, industrial control rooms, and airline reservation systems and the user community emphasized regular professional users. These admirable efforts influenced many designers and contributed to the 1980s corporate design guidelines from Apple, Microsoft, and others covering personal computers, desktop environments, and public access kiosks.

Then, the emergence of the World Wide Web changed everything. The underlying principles were similar, but the specific decisions that designers had to make required new guidelines. The enormously growing community of designers eagerly consulted useful guidelines from sources as diverse as Yale University, Sun Microsystems, the Library of Congress, and Ameritech. Many of these designers had little experience and were desperate for any guidance about screen features and usability processes. Sometimes they misinterpreted or mis-applied the guidelines, but at least they could get an overview of the issues that were important.

As Web usability guidelines became more widely used and consulted, discrepancies and contradictions became subjects of lively discussion at usability conferences and human-computer interaction research seminars. For example, many early Web guidelines documents were vague about appropriate numbers of links per page, sometimes falling back to mention George Miller's famous notion of seven plus or minus two. His work dealt with short-term memory capacity, but in studying a Web page, this factor has little bearing. As controversy grew, researchers collected dramatic empirical evidence that broader shallow trees were superior in information presentation websites.

Fortunately, the remarkable growth of the professional community of Web designers was matched by a healthy expansion of the academic community in psychology, computer science, information systems, and related disciplines. The research community went to work on the problems of menu design, navigation, screen layout, response time, and many more. Not every experiment is perfect, but the weight of validated results from multiple studies provides crucial evidence that can be gainfully applied in design.

This newest set of guidelines from the prestigious team assembled by the National Cancer Institute makes important contributions that will benefit practitioners and researchers. They have done the meticulous job of scouring the research literature to find support for design guidelines, thereby clarifying the message, resolving inconsistencies, and providing sources for further reading. Researchers will also benefit by this impressive compilation that will help them understand the current state of the art and see what problems are unresolved. Another impact will be on epistemologists and philosophers of science who argue about the relevance of research to practice. It is hard to recall a project that has generated as clear a demonstration of the payoff of research for practice.

The educational benefits for those who read the guidelines will be enormous. Students and newcomers to the field will profit from the good survey of issues that reminds them of the many facets of Web design. Experienced designers will find subtle distinctions and important insights. Managers will appreciate the complexity of the design issues and gain respect for those who produce effective websites.

Enthusiasms and Cautions

My enthusiasms for this NCI guidelines project and its product are great, but they are tempered by several cautions. To put it more positively, the greatest benefits from these research-based guidelines will accrue to those who create effective processes for their implementation. My advice is to recognize the *Guidelines* as a "living document" and then apply the four Es: education, enforcement, exemption, and enhancement.

Education: Delivering a document is only the first stage in making an organization's guidelines process effective. Recipients will have to be motivated to read it, think about it, discuss it, and even complain about it.

Often a live presentation followed by a discussion can be effective in motivating use of guidelines.

Enforcement: While many designers may be willing to consider and apply the guidelines, they will be more diligent if there is a clear process of interface review that verifies that the guidelines have been applied. This has to be done by a knowledgeable person and time has to be built into the schedule to handle deviations or questions.

Exemption: Creative designers may produce innovative compelling Web page designs that were not anticipated by the *Guidelines* writers. To support creative work, managers should balance the enforcement process with an exemption process that is simple and rapid.

Enhancement: No document is perfect or complete, especially a guidelines document in a fast changing field like information technology. This principle has two implications. First, it means that the NCI or another organization should produce an annual revision that improves the *Guidelines* and extends them to cover novel topics. Second, it means that adopting organizations should consider adding local guidelines keyed to the needs of their community. This typically includes guidelines for how the organization logo, colors, titles, employee names, contact information, etc. are presented. Other common additions are style guides for terminology, templates for information, universal usability requirements, privacy policies, and legal guidance.

Finally, it is important to remember that as helpful as these research-based guidelines are, that they do not guarantee that every website will be effective. Individual designers make thousands of decisions in crafting websites. They have to be knowledgeable about the content, informed about the user community, in touch with the organizational goals, and aware of the technology implications of design decisions. Design is difficult, but these new research-based guidelines are an important step forward in providing assistance to those who are dedicated to quality.

– Ben Shneiderman, Ph.D.
University of Maryland
May 2003

Contributors

Special thanks to the following researchers who created the 'Strength of Evidence' Scale, assigned 'Strength of Evidence' ratings for each guideline, and provided many sources listed in this book.

Barbara Chaparro, Ph.D.

Director, Software Usability Research Laboratory
Wichita State University

Melody Ivory, Ph.D.

Assistant Professor, The Information School
Adjunct Assistant Professor, Department of Computer Science and Engineering, University of Washington

Bonnie John, Ph.D.

Associate Professor and Director of the Masters Program in Human-Computer Interaction, Human-Computer Interaction Institute
Carnegie Mellon University

Judy Ramey, Ph.D.

Professor and Chair, Department of Technical Communication
Director, University of Washington Laboratory for Usability Testing and Evaluation, University of Washington

Janice (Ginny) Redish, Ph.D.

President, Redish & Associates, Inc.

Jean Scholtz, Ph.D.

Visualization and Usability Group
National Institute of Standards and Technology

Tom Tullis, Ph.D.

Senior Vice President, Human Interface Design
Fidelity Investments

Don Zimmerman, Ph.D.

Professor of Journalism and Technical Communication
Co-Director Center for Research on Writing and Communication Technologies, Colorado State University

Special thanks to the following Web designers and usability specialists who assigned 'Relative Importance' ratings to each guideline and provided extremely valuable feedback on guideline wording and meaning.

Scot Campbell

Usability Specialist, USAA

Mike DeHart

Information Technology Specialist, Piedmont Environmental Council

Mike Dorsher, Ph.D.

Assistant Professor, Department of Communication and Journalism,
University of Wisconsin-Eau Claire

Franklin Givens

Performance Technologist/Web Designer, State Farm Insurance

Phil Goddard

Chief of Training, Development, and Delivery, Human Factors International

Bonnie John, Ph.D.

Associate Professor and Director of the Masters Program in Human-Computer Interaction, Carnegie Mellon University

Doug Nester

Independent Marketing Consultant

Stanley Page

Manager-Human Factors Engineering,
The Church of Jesus Christ of Latter-day Saints

Nathan Petersen

Web Architect, America First Credit Union

Tom Pizer

Vice President/Creative Services Division, Figma Software

Bijan Salehizadeh, M.D.

Manager-Product Marketing, Medtronic Vascular

Karla Steele

Principal, Steele & Company

Tom Weber

Data Architect, Argosy Gaming Company

Sean Wheeler

Lead Usability Specialist, Social Security Administration

Steve Wigginton

Senior Technologist, DST Innovis

Ron Zeno

Independent Usability Consultant

Translating this wealth of research has required the

talents and dedication of numerous people. The authors would like to acknowledge and thank the following individuals for their important contributions to this project.

Michael Ahmadi	James Alexander
Judith Bader	Lori Anschuetz
Abhijit Ghosh	Jay Blumenthal
Bill Hall	Marcia Changkit
Kim Harley	John Crabb
Craig Lafond	Katherine Davies
James Mathews	Douglas Eisemann
Janice R. Nall	Joy Hodge
Shruthi Nawab	Madhu Joshi
Philip Passarelli	Leah Moler
Mary Theofanos	Lynn Moler
Bill Trefzger	Irrsula Mpouma
Cari Wolfson	Sylvie Richards
	Tom Rogers
	Kay Springer

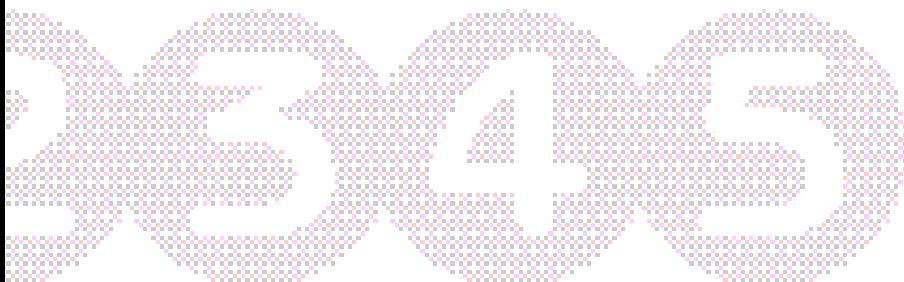


Table of Contents

xv.	Introduction
xvii.	How to Use this Book and the Guidelines
xx.	Background and Methodology
1	Chapter 1—Design Process and Evaluation
2	1:1 Set and State Goals
2	1:2 Use an Iterative Design Approach
3	1:3 Evaluate Websites Before and After Making Changes
3	1:4 Provide Useful Content
4	1:5 Understand and Meet Users' Expectations
5	1:6 Establish User Requirements
5	1:7 Use Parallel Design
6	1:8 Consider Many User Interface Issues
6	1:9 Focus on Performance Before Preference
6	1:10 Set Usability Goals
7	1:11 Select the Right Number of Participants
8	1:12 Be Easily Found on the Web
9	1:13 Recognize Tester Bias
9	1:14 Use Heuristics Cautiously
10	1:15 Use Cognitive Walkthroughs Cautiously
10	1:16 Apply Automatic Evaluation Methods
11	Chapter 2—Optimizing the User Experience
12	2:1 Display Information in a Directly Usable Format
13	2:2 Do Not Display Unsolicited Windows or Graphics
13	2:3 Provide Assistance to Users
14	2:4 Provide Printing Options
15	2:5 Standardize Task Sequences
16	2:6 Minimize Page Download Time
16	2:7 Warn of 'Time Outs'
17	2:8 Reduce the User's Workload
18	2:9 Use Users' Terminology in Help Documentation
18	2:10 Provide Feedback When Users Must Wait
19	2:11 Inform Users of Long Download Times
20	2:12 Do Not Require Users to Multitask While Reading
20	2:13 Design For Working Memory Limitations
21	2:14 Develop Pages that Will Print Properly

Table of Contents

22 Chapter 3—Accessibility

23 3:1 Comply with Section 508

23 3:2 Design Forms for Users Using Assistive Technology

24 3:3 Provide Text Equivalents for Non-Text Elements

25 3:4 Do Not Use Color Alone to Convey Information

25 3:5 Provide Equivalent Pages

26 3:6 Ensure that Scripts Allow Accessibility

26 3:7 Provide Client-Side Image Maps

26 3:8 Enable Users to Skip Repetitive Navigation Links

27 3:9 Provide Frame Titles

27 3:10 Test Plug-ins and Applets for Accessibility

28 3:11 Synchronize Multimedia Elements

28 3:12 Do Not Require Style Sheets

28 3:13 Avoid Screen Flicker

29 Chapter 4—Hardware and Software

30 4:1 Design for Common Browsers

31 4:2 Account for Browser Differences

32 4:3 Design for Popular Operating Systems

33 4:4 Design for User's Typical Connection Speed

33 4:5 Design for Commonly Used Screen Resolutions

34 Chapter 5—The Homepage

35 5:1 Create a Positive First Impression of Your Site

36 5:2 Ensure the Homepage Looks like a Homepage

37 5:3 Show All Major Options on the Homepage

38 5:4 Enable Access to the Homepage

39 5:5 Attend to Homepage Panel Width

40 5:6 Announce Changes to a Website

41 5:7 Communicate the Website's Purpose

42 5:8 Limit Prose Text on the Homepage

43 5:9 Limit Homepage Length

44 Chapter 6—Page Layout

45 6:1 Set Appropriate Page Lengths

46 6:2 Use Frames When Functions Must Remain Accessible

47 6:3 Establish Level of Importance

48 6:4 Place Important Items at Top Center

49 6:5 Place Important Items Consistently

50 6:6 Structure for Easy Comparison

Table of Contents

51 6:7 Use Moderate White Space

52 6:8 Align Items on a Page

53 6:9 Choose Appropriate Line Lengths

54 6:10 Avoid Scroll Stoppers

55 Chapter 7—Navigation

56 7:1 Provide Feedback on Users' Location

57 7:2 Use a Clickable 'List of Contents' on Long Pages

58 7:3 Do Not Create Pages with No Navigational Options

59 7:4 Differentiate and Group Navigation Elements

60 7:5 Use Descriptive Tab Labels

61 7:6 Present Tabs Effectively

62 7:7 Use Site Maps

63 7:8 Use Appropriate Menu Types

64 7:9 Keep Navigation-only Pages Short

65 7:10 Use 'Glosses' to Assist Navigation

66 Chapter 8—Scrolling and Paging

67 8:1 Eliminate Horizontal Scrolling

68 8:2 Use Scrolling Pages for Reading Comprehension

68 8:3 Use Paging Rather Than Scrolling

69 8:4 Scroll Fewer Screenfuls

70 8:5 Facilitate Rapid Scrolling

71 Chapter 9—Headings, Titles, and Labels

72 9:1 Use Clear Category Labels

73 9:2 Use Unique and Descriptive Headings

74 9:3 Use Descriptive Row and Column Headings

75 9:4 Use Descriptive Headings Liberally

76 9:5 Provide Descriptive Page Titles

77 9:6 Highlight Critical Data

78 9:7 Provide Users with Good Ways to Reduce Options

79 9:8 Use Headings in the Appropriate HTML Order

80 Chapter 10—Links

81 10:1 Provide Consistent Clickability Cues

82 10:2 Avoid Misleading Cues to Click

83 10:3 Use Text for Links

84 10:4 Use Meaningful Link labels

85 10:5 Match Link Names with Their Destination Pages

Table of Contents

86 10:6 Ensure that Embedded Links are Descriptive

87 10:7 Repeat Important Links

88 10:8 Designate Used Links

89 10:9 Link to Related Content

90 10:10 Link to Supportive Information

91 10:11 Use Appropriate Text Link Lengths

92 10:12 Indicate Internal vs. External Links

93 10:13 Use 'Pointing-and-Clicking'

94 10:14 Clarify Clickable Regions of Images

95 Chapter 11—Text Appearance

96 11:1 Use Black Text on Plain, High-Contrast Backgrounds

97 11:2 Ensure Visual Consistency

98 11:3 Format Common Items Consistently

98 11:4 Use at Least 12-Point Font

99 11:5 Use Familiar Fonts

100 11:6 Emphasize Importance

101 11:7 Use Attention-Attracting Features when Appropriate

102 Chapter 12—Lists

103 12:1 Order Elements to Maximize User Performance

104 12:2 Display Related Items in Lists

105 12:3 Introduce Each List

106 12:4 Format Lists to Ease Scanning

107 12:5 Start Numbered Items at One

107 12:6 Place Important Items at Top of the List

108 12:7 Capitalize First Letter of First Word in Lists

109 12:8 Use Appropriate List Style

110 Chapter 13—Screen-based Controls (Widgets)

111 13:1 Distinguish Required and Optional Data Entry Fields

112 13:2 Detect Errors Automatically

113 13:3 Minimize User Data Entry

114 13:4 Label Data Entry Fields Clearly

115 13:5 Put Labels Close to Data Entry Fields

116 13:6 Label Pushbuttons Clearly

117 13:7 Label Data Entry Fields Consistently

117 13:8 Allow Users to See Their Entered Data

118 13:9 Display Default Values

Table of Contents

119 13:10 Use a Minimum of Two Radio Buttons

119 13:11 Use Radio Buttons for Mutually Exclusive Selections

120 13:12 Use Check Boxes to Enable Multiple Selections

121 13:13 Use Familiar Widgets

122 13:14 Use a Single Data Entry Method

123 13:15 Partition Long Data Items

124 13:16 Do Not Make User-Entered Codes Case Sensitive

124 13:17 Place Cursor in First Data Entry Field

125 13:18 Provide Auto-tabbing Functionality

125 13:19 Label Units of Measurement

126 13:20 Ensure that Double-Clicking Will Not Cause Problems

126 13:21 Do Not Limit Viewable List Box Options

127 13:22 Use Open Lists to Select One from Many

128 13:23 Prioritize Pushbuttons

129 13:24 Minimize Use of the Shift Key

129 13:25 Use Data Entry Fields to Speed Performance

130 Chapter 14—Graphics, Images, and Multimedia

131 14:1 Use Video, Animation, and Audio Meaningfully

131 14:2 Include Logos

132 14:3 Limit Large Images Above the Fold

133 14:4 Limit the Use of Images

134 14:5 Label Clickable Images

135 14:6 Ensure that Images Do Not Slow Downloads

135 14:7 Use Thumbnail Images to Preview Larger Images

136 14:8 Graphics Should Not Look Like Banner Ads

137 14:9 Use Simple Background Images

138 14:10 Include Actual Data with Data Graphics

139 14:11 Display Monitoring Information Graphically

140 14:12 Introduce Animation

141 14:13 Ensure Website Images Convey Intended Messages

142 14:14 Use Images to Facilitate Learning

143 14:15 Emulate Real-World Objects

144 Chapter 15—Writing Web Content

145 15:1 Define Acronyms and Abbreviations

146 15:2 Use Abbreviations Sparingly

147 15:3 Use Familiar Words

147 15:4 Use Mixed Case with Prose

148 15:5 Avoid Jargon

149 15:6 Make First Sentences Descriptive

150 15:7 Use Active Voice

150 15:8 Write Instructions in the Affirmative

151 15:9 Limit the Number of Words and Sentences

152 15:10 Limit Prose Text on Navigation Pages

153 15:11 Make Action Sequences Clear

154 Chapter 16—Content Organization

155 16:1 Organize Information Clearly

156 16:2 Put Critical Information Near the Top of the Website

157 16:3 Facilitate Scanning

158 16:4 Group Related Elements

159 16:5 Display Only Necessary Information

160 16:6 Ensure that Necessary Information is Displayed

161 16:7 Format Information for Multiple Audiences

162 16:8 Design Quantitative Content for Quick Understanding

163 16:9 Use Color for Grouping

164 Chapter 17—Search

165 17:1 Provide a Search Option on Each Page

166 17:2 Ensure Usable Search Results

167 17:3 Allow Simple Searches

168 17:4 Make Upper- and Lowercase Search Terms Equivalent

168 17:5 Design Search Engines to Search the Entire Site

169 17:6 Design Search Around Users' Terms

169 17:7 Notify Users When Multiple Search Options Exist

170 17:8 Provide Search Templates

171 Glossary

177 Appendices

187 Sources

211 Author Index

219 Index

231 About the Authors

Introduction

The Research-Based Web Design and Usability Guidelines (*Guidelines*) were developed by the Communication Technologies Branch (CTB) of the National Cancer Institute (NCI) in the U.S. Department of Health and Human Services. The *Guidelines* were developed to assist those involved in the creation of websites base their decisions on the current and best available evidence. The *Guidelines* are particularly relevant to the design of information-oriented sites, but can be applied across the wide spectrum of websites.

Who Are the *Guidelines* for?

The primary audiences for the *Guidelines* are website designers, managers, and others involved in the creation or maintenance of websites. A secondary audience is researchers who investigate Web design issues. This resource will help them determine what research has been conducted and where none exists. To learn more about how these audiences may benefit from the *Guidelines*, see page xvii.

Why Did NCI Create the *Guidelines*?

NCI created this set of guidelines for several reasons:

- 1) To create better and more usable cancer information websites. NCI is mandated to provide clear information in an efficient and effective manner to cancer patients, health professionals, researchers, and the public. Translating the latest Web design research into a practical, easy-to-use format is essential to the effective design of NCI's numerous websites. The approach taken to produce the *Guidelines* is consistent with NCI's overall cancer information dissemination model—rapidly collect, organize, and distribute information in a usable format to those who need it.
- 2) To provide quantified, peer-reviewed website design guidelines. This resource does not exist anywhere else. Most Web design guidelines are lacking key information needed to be effective. For example, many guideline sets:
 - Are based on the personal opinions of a few experts;
 - Do not provide references to support them;
 - Do not provide any indication as to whether a particular guideline represents a consensus of researchers, or if it has been derived from a one-time, non-replicated study; and
 - Do not give any information about the relative importance of individual guidelines.

By addressing these issues, the *Guidelines* will help enable NCI and other organizations to make more effective design decisions.

Each guideline in this book shows a rating of its “Relative Importance” to the success of a website, and a rating of the “Strength of Evidence” supporting the guideline. Carefully selected panels of professional Web designers, usability specialists, and academic researchers contributed to these ratings. The ratings allow the user to quickly ascertain which guidelines have the greatest impact on the success of a website, and to determine the nature and quality of the supporting evidence. The “Relative Importance” and “Strength of Evidence” ratings are unique to the NCI *Guidelines*.

- 3) To stimulate research into areas that will have the greatest influence on the creation of usable websites. There are numerous Web design questions for which a research-based answer cannot be given. While there are more than 1,000 papers published each year related to Web design and usability, much of this research is not based on the most important (or most common) questions being asked by Web designers. By providing an extensive list of sources and “Strength of Evidence” ratings in the *Guidelines*, NCI hopes to highlight issues for which the research is conclusive and attract researchers’ attention to the issues most in need of answers.

How to Contribute Additional References?

The authors of the *Guidelines* attempted to locate as many references and source documents as possible. However, some important guidelines may not have been created, and some applicable references may have been missed. Readers who are aware of an original reference pertaining to an existing guideline, or who have a suggestion for a new research-based guideline, should submit an email to: webguidelines@mail.nih.gov.

Please include the following information in an email:

- Reference information—author, title, publication date, source, etc. (Remember, books are usually not original references.);
- The guideline to which the reference applies;
- If suggesting a new guideline, a draft of the guideline; and
- A copy of the source (or a link to it), if available.

This information will help NCI maintain the *Guidelines* as a current and accurate resource.

How to Use this Book and the Guidelines

Successful use of the *Guidelines* depends on how they are disseminated and used within an organization. Simply providing the *Guidelines* to designers and managers may not be enough to spur the adoption and use of the *Guidelines*.

How Audiences Will Benefit

The *Guidelines* offer benefits to four key audiences:

- **Designers**
The *Guidelines* provide a clear sense of the range of issues that designers—especially those new to the field—need to consider when planning and designing a website. Applying the *Guidelines* will help to reduce the negative impacts of “opinion-driven” design, and referring to evidence-based guidance can reduce the clashes resulting from differences of opinion between design team members.
- **Usability Specialists**
The *Guidelines* will help usability specialists evaluate the designs of websites. For example, usability specialists can use the *Guidelines* as a checklist to aid them during their review of websites. They also can create customized checklists that focus on the “Relative Importance” and “Strength of Evidence” scales associated with each guideline. For example, a usability specialist can create a checklist that only focuses on the top 25 most important issues related to the success of a website.
- **Managers**
The *Guidelines* will provide managers with a good overview and deep understanding of the wide range of usability and Web design issues that designers may encounter when creating websites. The *Guidelines* also provide managers with a “standard of usability” for their designers. Managers can request that designers follow relevant portions of the *Guidelines* and can use the *Guidelines* to set priorities. For example, during timeframes that require rapid design, managers can identify guidelines deemed most important to the success of a website—as defined by the “Relative Importance” score associated with each guideline—and require designers to focus on implementing those selected guidelines.
- **Researchers**
Researchers involved in evaluating Web design and Web process issues can use this set of guidelines to determine where new research is needed. Researchers can use the sources of evidence

provided for each guideline to assess the research that has been conducted, and to determine the need for additional research to increase the validity of the previous findings, or to challenge those findings. Perhaps more importantly, researchers also can use the *Guidelines* and their sources to formulate new and important research questions.

Options for Implementing the *Guidelines*

There are a variety of ways to use the *Guidelines* in website development efforts. Users can read the book from beginning to end to become familiar with all of the guidelines. The book also can be used as a reference to answer specific website design questions.

The *Guidelines* can be customized to fit most organizations' needs. The customization process can be approached in several ways:

- Encourage key stakeholders and/or decision makers to review the full set of guidelines and identify key guidelines that meet their Web design needs. For example, an organization may develop portal websites that focus exclusively on linking to other websites (as opposed to linking to content within its own website). Therefore, it may focus more on selecting guidelines from the "Links" and "Navigation" chapters and less from the content-related chapters.
- Selected guidelines can be merged with existing standards and guidelines currently used within an organization. This may reduce the number of documents or online tools that designers must reference, and thus improve the adoption and use of both the NCI *Guidelines* and existing standards and guidelines.

The "Relative Importance" and "Strength of Evidence" scales can be used to prioritize which guidelines to implement. For example, on page 177 of this book, the guidelines are listed in order of relative importance. Using this list, designers can focus on implementing the 25 or 50 most important guidelines. In turn, the "Strength of Evidence" ratings on page 182 can be used to determine the guidelines in which a designer can place the greatest confidence. Conversely, the guidelines with the lowest "Strength of Evidence" ratings could indicate where more time should be devoted during usability testing.

Additionally, Ben Shneiderman suggests four ways to enhance the application of the *Guidelines*: education; enforcement; exemption; and, enhancement. Please read his Foreword to consider other ways to successfully implement the *Guidelines*.

To share additional ideas for implementing or customizing the *Guidelines*, send them to webguidelines@mail.nih.gov.

Considerations before Using the *Guidelines*

The *Guidelines* are intended to improve the design and usability of information-based websites, but also can be applied across the wide spectrum of websites. When using the *Guidelines*, it is helpful to remember that:

- Within each chapter of this book, the guidelines are ordered according to their "Relative Importance" ratings. That is, the most important guidelines are toward the beginning of a chapter and the less important ones are toward the end. Readers may have a tendency to think that guidelines with one or two bullets on the "Relative Importance" scale are not important. However, it is crucial to note that all guidelines in this book were rated as at least "somewhat important" by the review team, otherwise they would not have been selected for inclusion in the book. Therefore, a guideline with one or two bullets is still important, just relatively less so than a guideline with four or five bullets.
- The *Guidelines* may not be applicable to all audiences and contexts. For example, they may not apply to websites used by audiences with low literacy skills that have special terminology and layout needs. In general, these guidelines apply to English language websites designed for adults who are between 18 and 75 years of age.
- The *Guidelines* may not adequately consider the experience of the designer. For example, a designer may have specialized knowledge about designing for a particular audience or context. These guidelines are adaptable and are not fixed rules.
- The *Guidelines* may not reflect all evidence from all disciplines related to Web design and usability. Considerable effort has been made to include research from a variety of fields including human factors, cognitive psychology, computer science, usability, and technical communication. However, other disciplines may have valuable research that is not reflected in these guidelines.
- Some "Strength of Evidence" ratings are low because there is a lack of research for that particular issue. The "Strength of Evidence" scale used to rate each guideline was designed to value research-based evidence, but also to acknowledge experience-based evidence including expert opinion. Low "Strength of Evidence" ratings should encourage the research of issues that are not currently investigated.

Background and Methodology

The National Cancer Institute's (NCI) Research-Based Web Design and Usability Guidelines project began in March of 2000. Since that time, each guideline presented in this book has undergone an extensive internal and external review. The process used to create the *Guidelines* is presented here.

Step 1: Creating the Initial Set of Guidelines

The NCI's Communication Technologies Branch (CTB) needed to develop a set of guidelines that would help designers build websites that are based on the best available research. The initial set of guidelines were drawn from existing Web design guideline and style guides, published research articles, research summaries, publicly available usability test reports, and lessons learned from in-house usability tests. This effort resulted in more than 500 guidelines.

Step 2: Reviewing the Initial Set of Guidelines

The initial set of 500 guidelines was far too many for website designers to use effectively. CTB initiated an internal review process to:

- Identify and combine similar guidelines;
- Identify and resolve guidelines that conflicted with each other; and
- Reword unclear guidelines.

This internal review was conducted by CTB staff and consultants. Each of the reviewers had experience in website design, usability engineering, technical communication, software design, computer programming and/or human-computer interaction. The internal review reduced the initial set of guidelines to 398.

Step 3: Determining the "Relative Importance" of Each Guideline

To determine the 'Relative Importance' of each guideline, sixteen external reviewers were recruited. Half of these reviewers were website designers and half were usability specialists. Reviewers evaluated each guideline and then answered the question, "How important is this guideline to the overall success of a website?" by assigning a score from a scale that ranged from "Extremely Important" to "Not Important."

Step 4: Validating the Initial "Relative Importance" Ratings

After the initial review by the 16 website practitioners (designers and usability specialists), the set of guidelines was reduced to 287. Those guidelines that were rated as having little importance to the success of a website were eliminated. Many guidelines were edited and clarified based on feedback from the reviewers. Also, a few new guidelines were added as new research was gathered.

To validate the "Relative Importance" ratings, the same 16 evaluators were asked to confirm or modify their previous ratings with knowledge of their own and the average rating from the previous review.

Step 5: Determining the "Strength of Evidence" for Each Guideline

The next step was to generate a reliable 'Strength of Evidence' rating for each guideline. To do this, CTB recruited a group of eight researchers from a variety of fields—including usability, user experience, documentation, computer science, and cognitive psychology—that have an influence on Web design. These reviewers were all published researchers with doctoral degrees, experienced peer reviewers, and knowledgeable of experimental design.

Developing the "Strength of Evidence" ratings for each guideline was conducted in three parts. In Part One, reviewers were asked to classify each guideline as having "strong," "weak," or "no" research evidence to support it. The goal was to determine which guidelines had no research evidence so that they could be pulled out, and hence, help reviewers focus on rating the remaining set. Reviewers also were asked to provide new sources of evidence for each guideline (if available).

Based on the results of Part One, the project team learned that there was very little agreement on what constitutes "strong," "weak," or "no" research evidence.

Therefore, the project team planned Part Two to generate a common framework among the reviewers.

Part Two had the reviewers attend a one-day meeting and agree on the following scale for rating the "Strength of Evidence" for each guideline.

5 – Strong Research Support **12345**

- Cumulative and compelling, supporting research-based evidence
- At least one formal, rigorous study with contextual validity
- No known conflicting research-based findings
- Expert opinion agrees with the research

4 – Moderate Research Support **12340**

- Cumulative research-based evidence
- There may or may not be conflicting research-based findings
- Expert opinion
 - Tends to agree with the research, and
 - A consensus seems to be building

3 – Weak Research Support **12300**

- Limited research-based evidence
- Conflicting research-based findings may exist
 - and/or -
- There is mixed agreement of expert opinions

2 – Strong Expert Opinion Support 12000

- No research-based evidence
- Experts tend to agree, although there may not be a consensus
- Multiple supporting expert opinions in textbooks, style guides, etc.)
- Generally accepted as a ‘best practice’ or reflects ‘state of practice’

1 – Weak Expert Opinion Support 10000

- No research-based evidence
- Limited or conflicting expert opinion

The reviewers also agreed upon a set of categories to classify the many sources that had been collected. The reviewers assigned each reference to one of the following categories:

- Rigorous observational study (e.g., ethnographic evaluation)
- Hypothesis-oriented experiment
- Model-based evaluation
- Expert opinion with no or few references
- Reference-base literature review, chapter in a book, or meta-analysis
- Survey
- Textbook with many references
- Usability test results or summary of several usability tests (e.g., lessons learned)
- Exploratory study (e.g., “How long will people wait for a page to download?”)

Part Three had reviewers evaluate the available evidence for each guideline, and then assign a rating based on the 5-point scale described above. Because of the activities in Part Two, agreement among reviewers in classifying the evidence for each guideline substantially increased.

Step 6: Finding Graphic Examples for the Guidelines

To ensure that users clearly understand the meaning of the guideline, the project team identified and reviewed several possible examples for each guideline, and selected the strongest examples.

Step 7: Grouping, Organizing, and Usability Testing the Guidelines

To ensure that the information about specific Web design issues is easy to find, a group of twenty website designers were asked to participate in a formal “grouping” of the guidelines by using a card-sorting exercise. Each of the twenty individuals put the guidelines into groups that reflected how they think about Web design issues, and then provided a name for each group. Data from this exercise was analyzed with specially developed software and formed the chapters of this book.

Several draft page layouts in print format were developed for this book. These drafts were usability tested to determine how best to facilitate readers’ ability to locate and understand information on a page. These findings, as well as readers’ preferences, served as the basis for the final page layout.

Design Process and Evaluation**There are several usability-related issues,**

methods, and procedures that require careful consideration when designing, developing, and testing websites. The most important of these are presented in this chapter, including “up-front” issues such as setting clear and concise goals for a website, determining a correct and exhaustive set of user requirements, ensuring that the website meets user’s expectations, setting usability goals, taking usability measurements of the existing site for later comparison, and providing useful content.

To ensure the best possible outcome, designers should consider a full range of user interface issues, and work to create a website that enables the best possible human performance. The current research suggests that the best way to begin the construction of a website is to have many different people propose design solutions (i.e., parallel design), and then to follow-up using an iterative design approach. This requires conducting the appropriate usability tests and using the findings to make changes to the website.

There are two major considerations when conducting usability testing. The first is to ensure that the correct number of test participants are used; and the second is to reduce “tester bias” as much as possible. Software-based automatic usability evaluation tools are available and should be used in addition to traditional usability testing. However, some popular usability testing methods (particularly heuristic evaluations and cognitive walkthroughs) must be used with caution.

1:1 Set and State Goals

Guideline: Identify and clearly articulate the primary goals of the website before beginning the design process.

Comments: Before starting design work, identify the primary goals of the website (educate, inform, entertain, sell, etc.). Goals determine the audience, content, function, and the site's unique look and feel. It is also a good idea to communicate the goals to, and develop consensus for the site goals from, management and those working on the website.

Sources: Badre, 2002; Coney and Steehouder, 2000; Detweiler and Omanson, 1996.

Relative Importance:

12345

Strength of Evidence:

12000

1:2 Use an Iterative Design Approach

Guideline: Develop and test prototypes through an iterative design approach to create the most useful and usable website.

Comments: Iterative design consists of creating paper and software prototypes, testing the prototypes, and then making changes based on the test results. The "test and make changes" process is repeated until the website meets performance benchmarks ("usability goals"). When these goals are met, the iterative process ends. Software tools are available to assist and facilitate the development of prototypes.

Sources: Badre, 2002; Bailey, 1993; Bradley and Johnk, 1995; Egan, Remde, Gomez, et al., 1989; Hong, et al., 2001; Jeffries, et al., 1991; Karat, Campbell and Fiegel, 1992; Redish and Dumas, 1993; Tan, et al., 2001.

Relative Importance:

12345

Strength of Evidence:

12345

1:3 Evaluate Websites Before and After Making Changes

Guideline: Conduct "before and after" studies when revising a website to determine changes in usability.

Comments: Conducting usability studies prior to and after a redesign will help designers determine if changes actually made a difference in the usability of the site. One study reported that only twenty-two percent of users were able to buy items on an original website. After a major redesign effort, eighty-eight percent of users successfully purchased products on that site.

Keep in mind that not all changes made by designers in each iteration may be beneficial—this will require additional, iterative rounds of testing.

Sources: John and Marks, 1997; Karat, 1994a; Ramey, 2000; Rehman, 2000; Williams, 2000; Wixon and Jones, 1996.

Relative Importance:

12345

Strength of Evidence:

12300

1:4 Provide Useful Content

Guideline: Provide content that is engaging, relevant, and appropriate to the audience.

Comments: Content is the information provided on a website. Do not waste resources providing easy access and good usability to the wrong content. One study found that content is the most critical element of a website. Other studies have reported that content is more important than navigation, visual design, functionality, and interactivity.

Sources: Asher, 1980; Badre, 2002; Baldwin, Peleg-Bruckner and McClintock, 1985; Celsi and Olson, 1988; Evans, 1998; Levine, 1996; Nielsen and Tahir, 2002; Nielsen, 1997b; Nielsen, 2000; Rajani and Rosenberg, 1999; Sano, 1996; Sinha, et al., 2001; Spyridakis, 2000; Stevens, 1980.

Relative Importance:

12345

Strength of Evidence:

12345

1:5 Understand and Meet Users' Expectations

Guideline: Ensure that the website format meets user expectations, especially related to navigation, content, and organization.

Comments: It is important for designers to develop an understanding of their users' expectations through task analyses and other research. Users can have expectations based on their prior knowledge and past experience. One study found that users acted on their own expectations even when there were indications on the screen to counter those expectations.

The use of familiar formatting and navigation schemes makes it easier for users to learn and remember the layout of a site. It's best to assume that a certain percentage of users will not use a website frequently enough to learn to use it efficiently. Therefore, using familiar conventions works best.

Sources: Carroll, 1990; Detweiler and Omanson, 1996; Lynch and Horton, 2002; Spool, et al., 1997; Wilson, 2000.

Example:



The Copyright Office website meets user expectations—links to the most likely user activities or queries (searching records, licensing and registering works, etc.) are prominently displayed and logically ordered, and there are very few distractions on the page.

Relative Importance:

12340

Strength of Evidence:

12000

1:6 Establish User Requirements

Guideline: Use all available resources to better understand users' requirements.

Comments: The greater the number of exchanges of information with potential users, the better the developers' understanding of the users' requirements. The more information that can be exchanged between developers and users, the higher the probability of having a successful website. These could include customer support lines, customer surveys and interviews, bulletin boards, sales people, user groups, trade show experiences, focus groups, etc. Successful projects require at least four (and average five) different sources of information. Do not rely too heavily on user intermediaries.

Sources: Adkisson, 2002; Brinck, Gergle and Wood, 2002; Buller, et al., 2001; Coble, Karat and Kahn, 1997; Keil and Carmel, 1995; Norman, 1993; Osborn and Elliott, 2002; Ramey, 2000; Vora, 1998; Zimmerman, et al., 2002.

Relative Importance:

12340

Strength of Evidence:

12340

1:7 Use Parallel Design

Guideline: Have several developers independently propose designs and use the best elements from each design.

Comments: Do not have individuals make design decisions by themselves or rely on the ideas of a single designer. Most designers tend to adopt a strategy that focuses on initial, satisfactory, but less than optimal, solutions. Group discussions of design issues (brainstorming) do not lead to the best solutions.

The best approach is parallel design, where designers independently evaluate the design issues and propose solutions. Attempt to "saturate the design space" before selecting the ideal solution. The more varied and independent the ideas that are considered, the better the final product will be.

Sources: Ball, Evans and Dennis, 1994; Buller, et al., 2001; Macbeth, Moroney and Biers, 2000; McGrew, 2001; Ovaska and Raiha, 1995; Zimmerman, et al., 2002.

Relative Importance:

12340

Strength of Evidence:

12340

See page xxi
for detailed descriptions
of the rating scales

12340

1:8 Consider Many User Interface Issues

Guideline: Consider as many user interface issues as possible during the design process.

Comments: Consider numerous usability-related issues during the creation of a website. These can include: the context within which users will be visiting a website; the experience levels of the users; the types of tasks users will perform on the site; the types of computer and connection speeds used when visiting the site; evaluation of prototypes; and the results of usability tests.

Sources: Bailey, 1996; Buller, et al., 2001; Graham, Kennedy and Benyon, 2000; Mayhew, 1992; Miller and Stimart, 1994; Zimmerman, et al., 2002.

Relative Importance:

12340

Strength of Evidence:

12300

1:9 Focus on Performance Before Preference

Guideline: If user performance is important, make decisions about content, format, interaction, and navigation before deciding on colors and decorative graphics.

Comments: Focus on achieving a high rate of user performance before dealing with aesthetics. Graphics issues tend to have little impact, if any, on users' success rates or speed of performance.

Sources: Baca and Cassidy, 1999; Grose, et al., 1999; Tractinsky, 1997.

Relative Importance:

12340

Strength of Evidence:

12300

1:10 Set Usability Goals

Guideline: Set performance goals that include success rates and the time it takes users to find specific information, or preference goals that address satisfaction and acceptance by users.

Comments: Setting user performance and/or preference goals helps developers build better websites. It can also help make usability testing more effective. For example, some intranet websites have set the goal that information will be found eighty percent of the time and in less than one minute.

Sources: Baca and Cassidy, 1999; Bradley and Johnk, 1995; Grose, et al., 1999; Sears, 1995.

Relative Importance:

12340

Strength of Evidence:

12300

1:11 Select the Right Number of Participants

Guideline: Select the right number of participants when using different usability techniques. Using too few may reduce the usability of a website; using too many wastes valuable resources.

Comments: Selecting the number of participants to use when conducting usability evaluations depends on the method being used:

- Inspection evaluation by usability specialists
 - The typical goal of an inspection evaluation is to have usability experts separately inspect a user interface by applying a set of broad usability guidelines. This is usually done with two to five people.
 - The research shows that as more experts are involved in evaluating the usability of a product, the greater the number of usability issues will be identified. However, for every true usability problem identified, there will be at least one usability issue that is not a real problem. Having more evaluators does decrease the number of misses, but it also increases the number of false positives. Generally, the more expert the usability specialists, the more useful the results.
- Performance usability testing with users
 - Early in the design process usability testing with a small number of users (approximately six) is sufficient to identify problems with the information architecture (navigation) and overall design issues. If the website has very different types of users (e.g., novices and experts), it is important to test with six or more of each type of user. Another critical factor in this preliminary testing is having trained usability specialists as the usability test facilitator and primary observers.
 - Once the navigation, basic content, and display features are in place, quantitative performance testing (measuring time, wrong pathways, failure to find content, etc.) can be conducted to ensure that usability objectives are being met. To measure each usability objective to a particular confidence level, such as 95%, requires a larger number of users in the usability tests.
 - When the performance of two sites is compared (i.e., an original site and a revised site), quantitative usability testing should be employed. Depending on how confident the usability specialist wants to be in the results, these tests could require a larger number of participants.
 - It is best to perform iterative cycles of usability testing over the course of the website's development. This enables usability specialists and designers to observe and listen to many users.

Sources: Bailey, 1996; Bailey, 2000c; Brinck and Hofer, 2002; Chin, 2001; Dumas, 2001; Gray and Salzman, 1998; Lewis, 1993; Lewis, 1994; Nielsen and Landauer, 1993; Perfetti and Landesman, 2001b; Virzi, 1990; Virzi, 1992.

Relative Importance:

12340

Strength of Evidence:

12340

1:12 Be Easily Found on the Web

Guideline: In order to have a high probability of being accessed, ensure that a website is in the “top thirty” references presented from a major search engine.

Comments: One study showed that users usually do not look at websites that are not in the “top thirty.” Some of the features required to be in the “top thirty” include appropriate meta-content and page titles, the number of links to the website, as well as updated registration with the major search engines.

Sources: Amento, et al., 1999; Dumais, Cutrell and Chen, 2001; Lynch and Horton, 2002; Spink, Bateman and Jansen 1999.

Example:

The below snippet of html code illustrates one important way of ensuring that a website will be found by search engines—embedding keyword metatags. These keywords are read by search engines and used to categorize websites; understanding typical users will provide clues as to what keywords should be used.

```
<meta name="description" content="U. S. Department of State Home Page">
```

```
<meta name="keywords" content="DOS, Department of State, Public Diplomacy, Country, Bureau, Government, United States Foreign Policy, Powell, Secretary of State, U.S. Department of State, Embassy, Consulate, American Culture, Society, Values, International, Public Affairs, Economic">
```

Relative Importance:

12340

Strength of Evidence:

12340



1:13 Recognize Tester Bias

Guideline: Recognize that a strong individual and group tester bias seems to exist when evaluating the usability of websites.

Comments: All testers seem to have a bias toward finding certain numbers and types of usability problems. One study reported that four testing teams found a range of four to ninety-eight usability problems when performance testing the exact same system. More than ninety percent of the problems found by each team were found only by the one team.

Another study reported that nine independent testing teams found a range of 10 to 150 usability problems when performance testing the exact same website. In this study, more than half of the problems found by each team were found only by that team.

Designers should precisely indicate the usability objectives of their websites to usability testers and evaluators.

Sources: Hertzum and Jacobsen, 2001; Jacobsen, Hertzum and John, 1998; Molich, et al., 1998; Molich, et al., 1999; Nielsen and Molich, 1990; Nielsen, 1992; Nielsen, 1993; Redish and Dumas, 1993; Selvidge, 2000.

Relative Importance:

12300

Strength of Evidence:

12345

1:14 Use Heuristics Cautiously

Guideline: Use heuristic evaluations and expert reviews with caution.

Comments: It is a common practice to conduct a heuristic evaluation (i.e., expert review) and resolve obvious problems before conducting usability performance tests. Heuristic evaluations should be used cautiously because they appear to detect far more potential problems than actually exist, when compared with performance testing results. Of the potential problems predicted by heuristic evaluations, studies have shown that less than fifty percent were found to be actual problems in a performance usability test. In addition, more than thirty-five percent of actual problems in the performance test were missed altogether by several heuristic evaluators. Heuristic reviews may best be used to identify potential usability issues to evaluate during usability testing.

Sources: Bailey, Allen and Raiello, 1992; Catani and Biers, 1998; Cockton and Woolrych, 2001; Nielsen and Landauer, 1993; Rooden, Green and Kanis, 1999; Stanton and Stevenage, 1998.

Relative Importance:

12000

Strength of Evidence:

12345

1:15 Use Cognitive Walkthroughs Cautiously

Guideline: Use cognitive walkthroughs with caution.

Comments: Cognitive walkthroughs are often conducted to resolve obvious problems before conducting performance tests. The cognitive walkthrough appears to detect far more potential problems than actually exist, when compared with performance usability testing results. Several studies have shown that only about twenty-five percent of the potential problems predicted by the cognitive walkthrough were found to be actual problems in a performance test. About thirteen percent of actual problems in the performance test were missed altogether in the cognitive walkthrough. Cognitive walkthroughs may best be used to identify potential usability issues to evaluate during usability testing.

Sources: Blackmon, et al., 2002; Desurvire, Kondziela and Atwood, 1992; Hassenzahl, 2000; Jacobsen and John, 2000; Jeffries and Desurvire, 1992; John and Mashyna, 1997; Karat, 1994b; Karat, Campbell and Fiegel, 1992; Spencer, 2000.

Relative Importance:

12000

Strength of Evidence:

12345

1:16 Apply Automatic Evaluation Methods

Guideline: Use appropriate 'automatic evaluation' methods to conduct initial evaluations on websites.

Comments: An 'automatic evaluation' method is one where software is used to evaluate a website. An 'automatic evaluation' tool can help find certain types of design difficulties, such as pages that will load slowly, missing links, use of jargon, potential accessibility problems, etc. While 'automatic evaluation' methods are useful, they should not be used as a substitute for evaluations or usability testing with typical users. There are many commercially available automatic evaluation methods available for checking on a variety of website parameters.

Sources: Brajnik, 2000; Campbell and Stanley, 1963; Gray and Salzman, 1998; Holleran, 1991; Ivory and Hearst, 2002; Ramey, 2000; Scholtz, 1998; World Wide Web Consortium, 2001.

Relative Importance:

10000

Strength of Evidence:

12300

Optimizing the User Experience

Websites should be designed to facilitate and

encourage efficient and effective human-computer interactions.

Designers should make every attempt to reduce the user's workload by taking advantage of the computer's capabilities. Users will make the best use of websites when information is displayed in a directly usable format and content organization is highly intuitive. Users also benefit from task sequences that are consistent with how they typically do their work, that do not require them to remember information for more than a few seconds, that have terminology that is readily understandable, and that do not overload them with information.

Users should not be required to wait for more than a few seconds for a page to load, and while waiting, users should be supplied with appropriate feedback. Users should be easily able to print information. Designers should never "push" unsolicited windows or graphics to users.

2:1 Display Information in a Directly Usable Format

Guideline: Display data and information in a format that does not require conversion by the user.

Comments: Present information to users in the most useful and usable format possible. Do not require users to convert or summarize information in order for it to be immediately useful. It is best to display data in a manner that is consistent with the standards and conventions most familiar to users.

To accommodate a multinational Web audience, information should be provided in multiple formats (e.g., centigrade and Fahrenheit for temperatures) or the user should be allowed to select their preferred formats (e.g., the 12-hour clock for American audiences and the 24-hour clock for European audiences).

Do not require users to convert, transpose, compute, interpolate, or translate displayed data into other units, or refer to documentation to determine the meaning of displayed data.

Sources: Ahlstrom and Longo, 2001; Casner and Larkin, 1989; Galitz, 2002; Gerhardt-Powals, 1996; Navai, et al., 2001; Smith and Mosier, 1986.

Example:

Birthweight and Gestation
(All figures are for U.S.)

- Median Weight at Birth: 3,000--3,499 grams (2000)
- Annual Number of Babies Born Low Birthweight: 307,030 (2000)
- Annual Percent Born Low Birthweight: 7.6 (2000)
- Annual Percent Born Very Low Birthweight: 1.4 (2000)
- Annual Number of Preterm Births: 467,201 (2000)
- Annual Percent Born Preterm: 11.6 (2000)

Comprehensive Data

- Live Births by Birthweight, Period of Gestation, and Sex

Right now, the official U.S. time is:
15:18:30
Friday, March 14, 2003
Accurate within 0.3 seconds

Change timezone You have chosen the Eastern timezone
Coordinated Universal Time -5 hours; Not Daylight Saving Time

Problems? Questions?

*Sun is shining in light region
It is night*

Displaying time in a 24-hour clock format is not suitable for U.S. civilian audiences.

Recognize that there is a difference between the data units used in science and medicine and those used generally. Data should be presented in the generally-accepted manner of the intended audience—in this case, pounds and ounces.

Relative Importance:

12345

Strength of Evidence:

12300

2:2 Do Not Display Unsolicited Windows or Graphics

Guideline: Do not have unsolicited windows or graphics “pop-up” to users.

Comments: Users have commented that unsolicited windows or graphics that “pop up” are annoying and distracting when they are focusing on completing their original activity.

Sources: Ahmadi, 2000.

Relative Importance:

12345

Strength of Evidence:

12300

2:3 Provide Assistance to Users

Guideline: Provide assistance for users who need additional help with the website.

Comments: Users sometimes require special assistance. This is particularly important if the site was designed for inexperienced users or has many first time users. For example, in one website that was designed for repeat users, more than one-third of users (thirty-six percent) were first time visitors. A special link was prepared that allowed new users to access more information about the content of the site and described the best way to navigate the site.

Sources: Covi and Ackerman, 1995; Morrell, et al., 2002; Nall, Koyani and Lafond, 2001; Plaisant, et al., 1997.

Example:

Envirofacts
Data Warehouse and Applications

A single point of access to select U.S. EPA environmental data.

First Time User
Is this your first visit to Envirofacts?
We recommend that you read the First Time User page to familiarize yourself with the site, then consult the Overview page for information about Envirofacts data.

First Time User
Queries, Maps, and Reports
Technical User

Welcome to Envirofacts, a single point of access to select U.S. EPA environmental data. This website provides access to several EPA databases that provide you with information about environmental activities that may affect air, water, and land anywhere in the United States.

Navigate throughout the Envirofacts website by using the main menu at the top of each page. Use this menu to review What's New on the website, read a brief Overview of the information contained in the Envirofacts database, see the latest Data Update dates for the various databases contained in Envirofacts, and view a clickable Site Map for the website. Some pages also have links on the left side of the page; these links are specific to each page. From the Overview page, for example, you can read article have recently featured or referenced Envirofacts, learn about the awards we have received, or find answers to our most frequently asked questions.

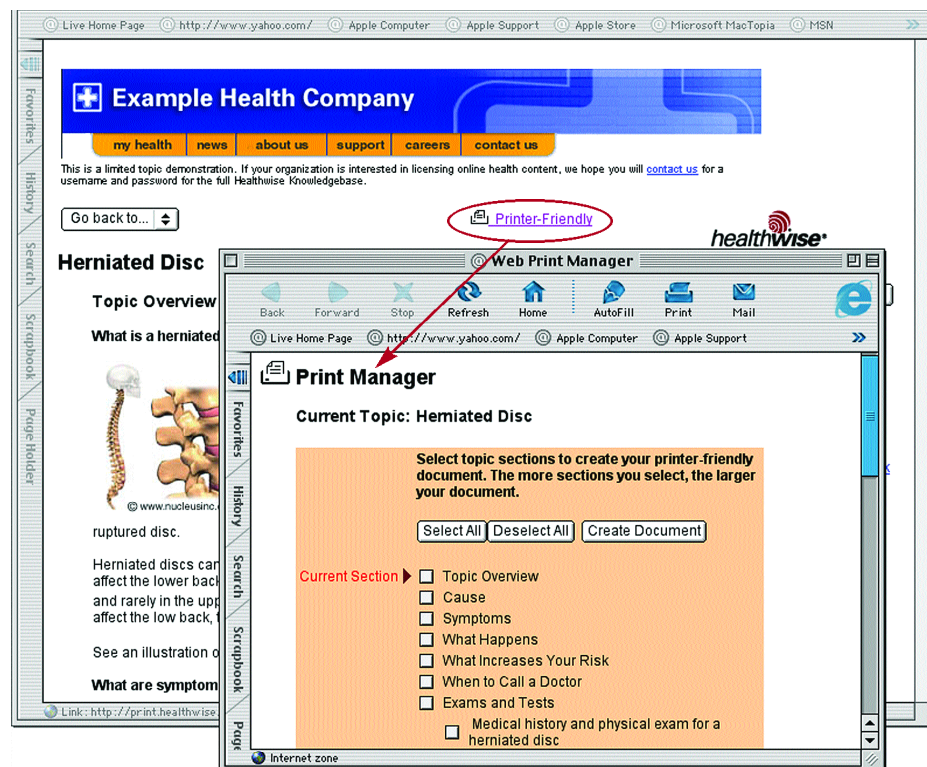
2:4 Provide Printing Options

Guideline: Provide a link to a complete printable or downloadable document if there are Web pages, documents, resources, or files that users will want to print or save in one operation.

Comments: Many users prefer to read text from a paper copy of a document. They find this to be more convenient, and it allows them to make notes on the paper. Users sometimes print pages because they do not trust the website to have pages for them at a later date, or they think they will not be able to find them again.

Sources: Detweiler and Omanson, 1996; Levine, 1996; Lynch and Horton, 2002; Nielsen, 1997e.

Example: Clicking on the "Print Friendly" link will open a new browser window that allows the user to choose the sections of the document they wish to print. This is particularly useful for long documents, where users may only be interested in a particular section.



Relative Importance:

12340

Strength of Evidence:

12000

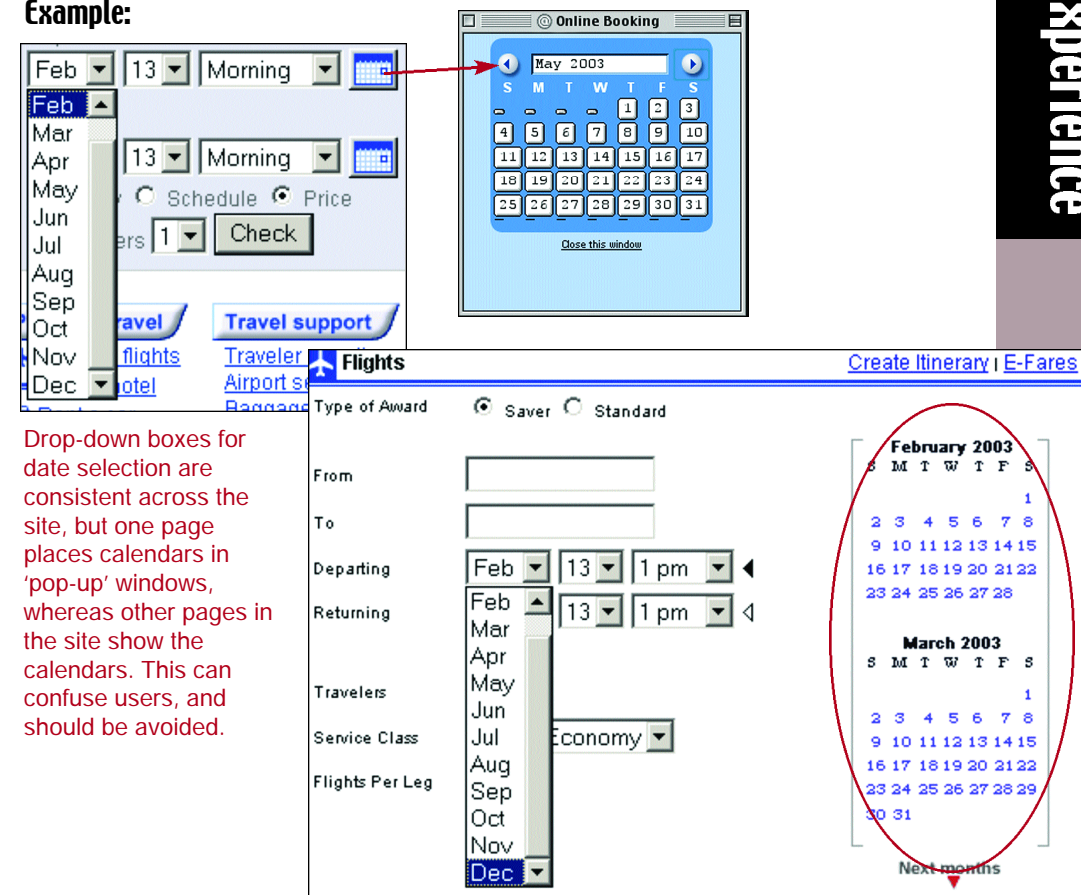
2:5 Standardize Task Sequences

Guideline: Allow users to perform tasks in the same sequence and manner across similar conditions.

Comments: Users learn certain sequences of behaviors and perform best when they can be reliably repeated. For example, users become accustomed to looking in either the left or right panels for additional information. Also, users become familiar with the steps in a search or checkout process.

Sources: Bovair, Kieras and Polson, 1990; Czaja and Sharit, 1997; Detweiler and Omanson, 1996; Foltz, et al., 1988; Kieras, 1997; Polson and Kieras, 1985; Polson, Bovair and Kieras, 1987; Polson, Muncher and Engelbeck, 1986; Smith, Bubb-Lewis and Suh, 2000; Sonderegger, et al., 1999; Ziegler, Hoppe and Fahrnrch, 1986.

Example:



Drop-down boxes for date selection are consistent across the site, but one page places calendars in 'pop-up' windows, whereas other pages in the site show the calendars. This can confuse users, and should be avoided.

Relative Importance:

12340

Strength of Evidence:

12345

See page xxi
for detailed descriptions
of the rating scales

12340

2:6 Minimize Page Download Time

Guideline: Minimize the time required to download a website's pages.

Comments: The best way to facilitate fast page loading is to minimize the number of bytes per page.

Sources: Barber and Lucas, 1983; Bouch, Kuchinsky and Bhatti, 2000; Byrne, John, et al., 1999; Evans, 1998; Lynch and Horton, 2002; Nielsen, 1997d; Spool, et al., 1997; Tiller and Green, 1999.

Relative Importance:

12340

Strength of Evidence:

12340

2:7 Warn of 'Time Outs'


Guideline: Let users know if a page is programmed to 'time out,' and warn users before time expires so they can request additional time.

Comments: Some pages are designed to 'time out' automatically (usually because of security reasons). Pages that require users to use them within a fixed amount of time can present particular challenges to users that read slowly or make entries slowly.

Sources: Koyani, 2001a; United States Government, 1998.

Example:

Email Member



For your protection, this page will time out in 45 minutes. Please send your email before time is up.

First contact? It's easy. Just let this person know what caught your eye, and what makes

Microsoft Internet Explorer timeout problems.

Microsoft Internet Explorer ("IE") users, please note that if you are running reports on large chapter 11 cases, such as PG&E, the IE browser may "time out" before the report is completed. Unfortunately, the "time out" problem is beyond the court's control.

Although the current version of WebPACER was developed specifically for Netscape 4.x, other browsers such as IE may also work. If you are using IE and you receive the "This page can not be displayed" message, please increase the "time out" settings on your browser. We apologize for any inconvenience.

To obtain a copy of the latest version of [Netscape](#),
Instructions for [Microsoft IE browsers](#).

See page xxi
for detailed descriptions
of the rating scales

12340

2:8 Reduce the User's Workload

Guideline: Allocate functions to take advantage of the inherent respective strengths of computers and users.

Comments: Let the computer perform as many tasks as possible, so that users can concentrate on performing tasks that actually require human processing and input. Ensure that the activities performed by the human and the computer take full advantage of the strengths of each. For example, calculating body mass indexes, remembering user IDs, and mortgage payments are best performed by computers.

Sources: Gerhardt-Powals, 1996; Moray and Butler, 2000; Sheridan, 1997.

Example:

Calculators

How Much is Your Monthly Payment?

The following information is needed to calculate your monthly payment. After providing the information, click on "Calculate Single Payment" for your payment calculation. For a payment schedule, click on "Calculate Payment Schedule." You can reset the values you entered by clicking on the "Reset Values" option.

* = Required field

Loan balance: *

Mortgage term: * Years

Interest rate: * %

Calculate Single Payment

Calculate Payment Schedule

Reset Values

In Calculators

Fannie Mae True Cost Calculator

How Much House Can You Afford?

What Monthly Payment Is Needed for a House with a Specific Sales Price?

How Much House Can You Afford with a Specific Monthly Payment?

How Much Is Your Monthly Payment?

Is Now a Good Time to Refinance?

When looking to buy a house, users will know the value of variables necessary to calculate a monthly payment (interest rate, loan amount, etc.), but are incapable of quickly calculating it themselves.

Existing Yahoo! users

Enter your ID and password to sign in

Yahoo! ID:

Password:

☐ Remember my ID on this computer

Mode: Standard | [Secure](#)

2:9 Use Users' Terminology in Help Documentation

Guideline: When giving guidance about using a website, use the users' terminology to describe elements and features.

Comments: There is varied understanding among users as to what many website features are called, and in some cases, how they are used. These features include 'breadcrumbs,' changing link colors after they've been clicked, the left and right panels on the homepage, the tabs at the top of many homepages, and the search capability. For example, if the term 'breadcrumb' is used in the help section, give enough context so that a user unfamiliar with that term can understand your guidance. If you refer to the 'navigation bar,' explain to what you are referring. Even if users know how to use an element, the terms they use to describe it may not be the same terms that a designer would use.

Sources: Bailey, Koyani and Nall, 2000; Foley and Wallace, 1974; Furnas, et al., 1987; Scanlon and Schroeder, 2000.

Relative Importance:

12300

Strength of Evidence:

12300

2:10 Provide Feedback When Users Must Wait

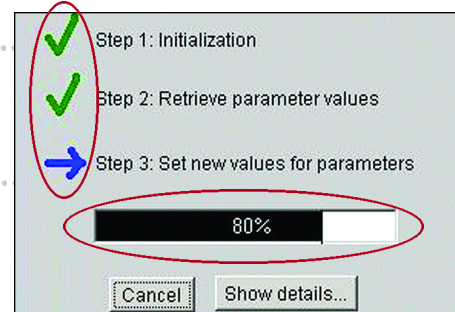
Guideline: Provide users with appropriate feedback while they are waiting.

Comments: If processing will take less than ten seconds, use an hourglass to indicate status. If processing will take up to sixty seconds or longer, use a process indicator that shows progress toward completion. If computer processing will take over one minute, indicate this to the user and provide an auditory signal when the processing is complete.

Users frequently become involved in other activities when they know they must wait for long periods of time for the computer to process information. Under these circumstances, completion of processing should be indicated by a non-disruptive sound (beep).

Sources: Bouch, Kuchinsky and Bhatti, 2000; Meyer, Shinar and Leiser, 1990; Smith and Mosier, 1986.

Example:



Relative Importance:

12300

Strength of Evidence:

12340

2:11 Inform Users of Long Download Times

Guideline: Indicate to users the time required to download an image or document at a given connection speed.

Comments: Providing the size and download time of large images or documents gives users sufficient information to choose whether or not they are willing to wait for the file to download. One study concluded that supplying users with download times relative to various connection speeds improves their website navigation performance.

Sources: Campbell and Maglio, 1999; Detweiler and Omanson, 1996; Evans, 1998; Nielsen, 2000.

Example:

Download Options:

Click here to [download entire report without images](#) (pdf format)

File size: 1.5 mb

Approx. download time using 56K modem: 4 minutes

Approx. download time using T1: 10 seconds

Click here to [download entire report without images](#) (zip format)

File size: 1.15 mb

Approx. download time using 56K modem: 3 minutes

Approx. download time using T1: 6 seconds

Click here to [download entire report with images](#) (pdf format)

File size: 82 mb

Approx. download time using 56K modem: 3.5 hours

Approx. download time using T1: 8 minutes

Click here to [download entire report with images](#) (zip format)

File size: 62.9 mb

Approx. download time using 56K modem: 2.5 hours

Approx. download time using T1: 6 minutes

See page xxi
for detailed descriptions
of the rating scales

12340

2:12 Do Not Require Users to Multitask While Reading

Guideline: If reading speed is important, do not require users to perform other tasks while reading from the monitor.

Comments: Generally, users can read from a monitor as fast as they can from paper, unless they are required to perform other tasks that require human 'working memory' resources while reading. For example, do not require users to look at the information on one page and remember it while reading the information on a second page. This can reliably slow their reading performance.

Sources: Baddeley, 1986; Evans, 1998; Mayes, Sims and Koonce, 2000; Spyridakis, 2000.

Relative Importance:

12300

Strength of Evidence:

12340

2:13 Design For Working Memory Limitations

Guideline: Do not require users to remember information from place to place on a website.

Comments: Users can remember relatively few items of information for a relatively short period of time. This 'working memory' capacity tends to lessen even more as people become older.

When users must remember information on one Web page for use on another page or another location on the same page, they can only remember about three or four items for a few seconds. If users must make comparisons, it is best to have the items being compared side-by-side so that users do not have to remember information—even for a short period of time.

Sources: Ahlstrom and Longo, 2001; Baddeley, 1986; Bailey, 2000a; Broadbent, 1975; Brown, 1958; Cockburn and Jones, 1996; Curry, McDougall and de Bruijn, 1998; Evans, 1998; Kennedy and Wilkes, 1975; LeCompte, 1999; LeCompte, 2000; MacGregor, 1987; McEneaney, 2001; Spyridakis, 2000.

Example:

A user ordering publications from this page is required to remember which

of the three similarly-titled fact sheets they want to order. A link to the fact sheet on the order form would allow the user to compare the products during the ordering process.

Brochures

<input type="checkbox"/>	20	NEW Colorectal Cancer Screening Saves Lives (996948) (max 25 copies)
<input checked="" type="checkbox"/>		NEW Colorectal Cancer Screening – A Circle of Life for Alaskan (997150)
<input type="checkbox"/>	20	Cáncer Colorrectal: Rompamos el Silencio (996198)(max 100 copies)
<input type="checkbox"/>	0	Colorectal Cancer: Let's Break the Silence (996010)(max 100 copies)

Relative Importance:

12300

Strength of Evidence:

12345

2:14 Develop Pages that Will Print Properly

Guideline: If users are likely to print one or more pages, develop pages with widths that print properly.

Comments: It is possible to display pages that are too wide to print completely on standard 8.5 x 11 inch paper in portrait orientation. Ensure that margin to margin printing is possible.

Sources: Ahlstrom and Longo, 2001; Evans, 1998; Gerhardt-Powals, 1996; Lynch and Horton, 2002; Spyridakis, 2000; Tullis, 2001; Zhang and Seo, 2001.

Example:

Sections of this page are trimmed when printed on standard 8.5 x 11 paper because of the design of the page.

Relative Importance:

12000

Strength of Evidence:

12000

See page xxi
for detailed descriptions
of the rating scales

12340

Websites should be designed to ensure that

everyone, including users who have difficulty seeing, hearing, and making precise movements, can use them. Generally, this means ensuring that websites facilitate the use of common assistive technologies. All United States Federal Government websites must comply with the Section 508 Federal Accessibility Standards.

With the exception of Guideline 2:7 and Guideline 9:3, all accessibility-related guidelines are found in this chapter. The sample of users who organized these guidelines assigned these two guidelines to other chapters. (See page xxii, Step 7 for more on how the guidelines were organized.)

Some of the major accessibility issues to be dealt with include:

- Provide text equivalents for non-text elements;
- Ensure that scripts allow accessibility;
- Provide frame titles;
- Enable users to skip repetitive navigation links;
- Ensure that plug-ins and applets meet the requirements for accessibility; and
- Synchronize all multimedia elements.

Where it is not possible to ensure that all pages of a site are accessible, designers should provide equivalent information to ensure that all users have equal access to all information.

For more information on Section 508 and accessibility, see www.section508.gov and www.usability.gov/accessibility/index.html.

3:1 Comply with Section 508

Relative Importance: *

12300

Strength of Evidence:

12000

Guideline: If a website is being designed for the United States government, ensure that it meets the requirements of Section 508 of the Rehabilitation Act. Ideally, all websites should strive to be accessible and compliant with Section 508.

Comments: Section 508 requires Federal agencies to ensure that their procurement of information technology takes into account the needs of all users—including people with disabilities. About eight percent of the user population has a disability that may make the traditional use of a website very difficult or impossible. About four percent have vision-related disabilities, two percent have movement-related issues, one percent have hearing-related disabilities, and less than one percent have learning-related disabilities.

Compliance with Section 508 enables Federal employees with disabilities to have access to and use of information and data that is comparable to that provided to others. This also enhances the ability of members of the public with disabilities to access information or services from a Federal agency.

For additional information on Section 508 and accessibility:

- <http://www.section508.gov>
- <http://www.w3.org/WAI/>
- <http://www.usability.gov/accessibility/index.html>

Sources: GVU, Georgia Institute of Technology, 1998; United States Government, 1998.

3:2 Design Forms for Users Using Assistive Technologies

Guideline: Ensure that users using assistive technology can complete and submit online forms.

Relative Importance: *

12340

Strength of Evidence:

12000

Comments: Much of the information collected through the Internet is collected using online forms. All users should be able to access forms and interact with field elements such as radio buttons and text boxes.

Sources: Covi and Ackerman, 1995; Morrell, et al., 2002; United States Government, 1998.

* Regardless of the "Relative Importance" rating assigned by the reviewers, U.S. Federal websites must adhere to all Section 508 guidelines (see Guideline 3:1).

3:3 Provide Text Equivalents for Non-Text Elements

Guideline: Provide a text equivalent for every non-text element that conveys information.

Comments: Text equivalents should be used for all non-text elements, including images, graphical representations of text (including symbols), image map regions, animations (e.g., animated GIFs), applets and programmatic objects, ascii art, frames, scripts, images used as list bullets, spacers, graphical buttons, sounds, stand-alone audio files, audio tracks of video, and video.

Sources: Chisholm, Vanderheiden and Jacobs, 1999a; Nielsen, 2000; United States Government, 1998.

Example:

Alt text allows the visually impaired user to understand the meaning of the picture.



* Regardless of the "Relative Importance" rating assigned by the reviewers, U.S. Federal websites must adhere to all Section 508 guidelines (see Guideline 3:1).

Relative Importance: *

12340

Strength of Evidence:

12000

See page xxi
for detailed descriptions
of the rating scales

12340

3:4 Do Not Use Color Alone to Convey Information

Guideline: Ensure that all information conveyed with color is also available without color.

Comments: Never use color as the only indicator for critical activities. About eight percent of males and about one-half of one percent of females have difficulty discriminating colors. Most users with color deficiencies have difficulty seeing colors in the green portion of the spectrum.

To accommodate color-deficient users, designers should:

- Select color combinations that can be discriminated by users with color deficiencies;
- Use tools to see what Web pages will look like when seen by color deficient users;
- Ensure that the lightness contrast between foreground and background colors is high;
- Increase the lightness contrast between colors on either end of the spectrum (e.g., blues and reds); and
- Avoid combining light colors from either end of the spectrum with dark colors from the middle of the spectrum.

Sources: Bailey, 1996; Chisholm, Vanderheiden and Jacobs, 1999c; Evans, 1998; Hess, 2000; Levine, 1996; Murch, 1985; Rigden, 1999; Smith and Mosier, 1986; Sullivan and Matson, 2000; Thorell and Smith, 1990; Tullis, 2001; United States Government, 1998; Wolfmaier, 1999; Vischeck, 2003.

Relative Importance: *

12345

Strength of Evidence:

12340

3:5 Provide Equivalent Pages

Guideline: Provide text-only pages with equivalent information and functionality if compliance with accessibility provisions cannot be accomplished in any other way.

Comments: When no other solution is available, one option is to design, develop and maintain a parallel website that does not contain any graphics. The pages in such a website should be readily accessible, and facilitate the use of screen readers and other assistive devices.

As a rule, ensure that text-only pages are updated as frequently and contain all of the same information as their non-text counterparts. Also inform users that text-only pages are exactly equivalent and as current as non-text counterparts.

Sources: Chisholm, Vanderheiden and Jacobs, 1999e; United States Government, 1998.

Relative Importance: *

12300

Strength of Evidence:

12000

3:6 Ensure that Scripts Allow Accessibility

Guideline: When designing for accessibility, ensure that the information provided on pages that utilize scripting languages to display content or to create interface elements can be read by assistive technology.

Comments: Whenever a script changes the content of a page, the change must be indicated in a way that can be detected and read by a screen reader. Also, if 'mouseovers' are used, ensure that they can be activated using a keyboard.

Sources: United States Government, 1998.

Relative Importance: *

12300

Strength of Evidence:

12000

3:7 Provide Client-Side Image Maps

Guideline: To improve accessibility, provide client-side image maps instead of server-side image maps.

Comments: Client-side image maps can be made fully accessible, whereas server-side image maps cannot be made accessible without employing a text alternative for each section of the map. To make client-side image maps accessible, each region within the map should be assigned alt text that can be read by a screen reader or other assistive device. Designers must ensure that redundant text links are provided for each active region of a server-side image map.

Sources: United States Government, 1998.

Relative Importance: *

12300

Strength of Evidence:

12300

3:8 Enable Users to Skip Repetitive Navigation Links

Guideline: To aid those using assistive technologies, provide a means for users to skip repetitive navigation links.

Comments: Developers frequently place a series of routine navigational links at a standard location—usually across the top, bottom or side of a page. For people using assistive devices, it can be a tedious and time-consuming task to wait for all of the repeated links to be read. Users should be able to avoid these links when they desire to do so.

Sources: United States Government, 1998.

Relative Importance: *

12300

Strength of Evidence:

12000

3:9 Provide Frame Titles

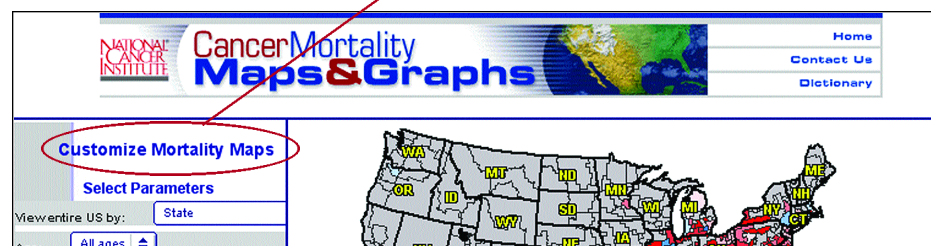
Guideline: To ensure accessibility, provide frame titles that facilitate frame identification and navigation.

Comments: Frames are used to divide the browser screen into separate areas, with each area presenting different, but usually related, information. For example, a designer may use a frame to place navigational links on the left side of a page, and put the main information in a larger frame on the right side. This allows users to scroll through the information section without disturbing the navigation section. Clear and concise frame titles enable people with disabilities to properly orient themselves when frames are used.

Sources: Chisholm, Vanderheiden and Jacobs, 1999f; United States Government, 1998.

Example:

Providing frame titles like that circled will allow visually impaired users to understand the purpose of the frame's content or its function. Note that the right frame does not contain a title, and thus poses accessibility concerns.



Relative Importance: *

12300

Strength of Evidence:

12000

3:10 Test Plug-ins and Applets for Accessibility

Guideline: To ensure accessibility, test any applets, plug-ins or other applications required to interpret page content to ensure that they can be used by assistive technologies.

Comments: Applets, plug-ins and other software can create problems for people using assistive technologies, and should be thoroughly tested for accessibility.

Sources: United States Government, 1998.

Relative Importance: *

12300

Strength of Evidence:

12000

* Regardless of the "Relative Importance" rating assigned by the reviewers, U.S. Federal websites must adhere to all Section 508 guidelines (see Guideline 3:1).

See page xxi for detailed descriptions of the rating scales

12340

3:11 Synchronize Multimedia Elements

Guideline: To ensure accessibility, provide equivalent alternatives for multimedia elements that are synchronized.

Comments: For multimedia presentations (e.g., a movie or animation), synchronize captions or auditory descriptions of the visual track with the presentation.

Sources: Ahlstrom and Longo, 2001; Chisholm, Vanderheiden and Jacobs, 1999b; Galitz, 2002; Mayhew, 1992.

Relative Importance: *

12000

Strength of Evidence:

12000

3:12 Do Not Require Style Sheets

Guideline: Organize documents so they are readable without requiring an associated style sheet.

Comments: Style sheets are commonly used to control Web page layout and appearance. Style sheets should not hamper the ability of assistive devices to read and logically portray information.

Sources: United States Government, 1998.

Relative Importance: *

12000

Strength of Evidence:

10000

3:13 Avoid Screen Flicker

Guideline: Design Web pages that do not cause the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.

Comments: Five percent of people with epilepsy are photosensitive, and may have seizures triggered by certain screen flicker frequencies. Most current monitors are unlikely to provoke seizures.

Sources: United States Government, 1998.

Relative Importance: *

12000

Strength of Evidence:

10000

* Regardless of the "Relative Importance" rating assigned by the reviewers, U.S. Federal websites must adhere to all Section 508 guidelines (see Guideline 3:1).

Hardware and Software

Designers are rarely free to do whatever comes

to mind. Just as designers consider their users' needs for specific information, they must also consider any constraints imposed on them by their users' hardware, software, and speed of connection to the Internet. Today, a single operating system dominates the personal computer market. Similarly, only two website browsers are favored by the vast majority of users. More than ninety percent of users have their monitor resolutions set to 800x600 or 1024x768 pixels. And while most users at work have high-speed Internet access, most users at home connect at dial-up (56K or less) speeds.

Within the constraints of available time, money, and resources, it is usually impossible to design for all users. Therefore, identify the hardware and software used by your primary and secondary audiences and design to maximize the effectiveness of your website.

4:1 Design for Common Browsers

Guideline: Design, develop and test for the most common browsers.

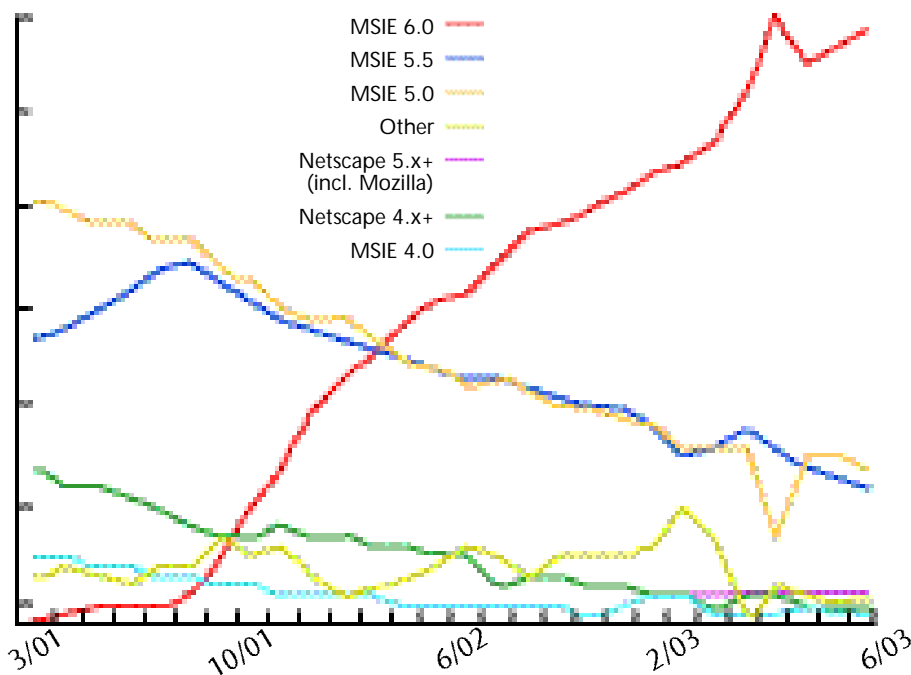
Comments: Designers should attempt to accommodate ninety-five percent of all users. Ensure that all testing of a website is done using the most popular browsers.

Sources of information about the most commonly used browsers:

- <http://www.google.com/press/zeitgeist.html>
- <http://www.thecounter.com/stats>

Sources: Evans, 1998; Jupitermedia Corporation, 2003; Morrell, et al., 2002; Nielsen, 1996b.

Example:



Web Browsers Used To Access Google
March 2001 – June 2003

Relative Importance:
12345
Strength of Evidence:
12000

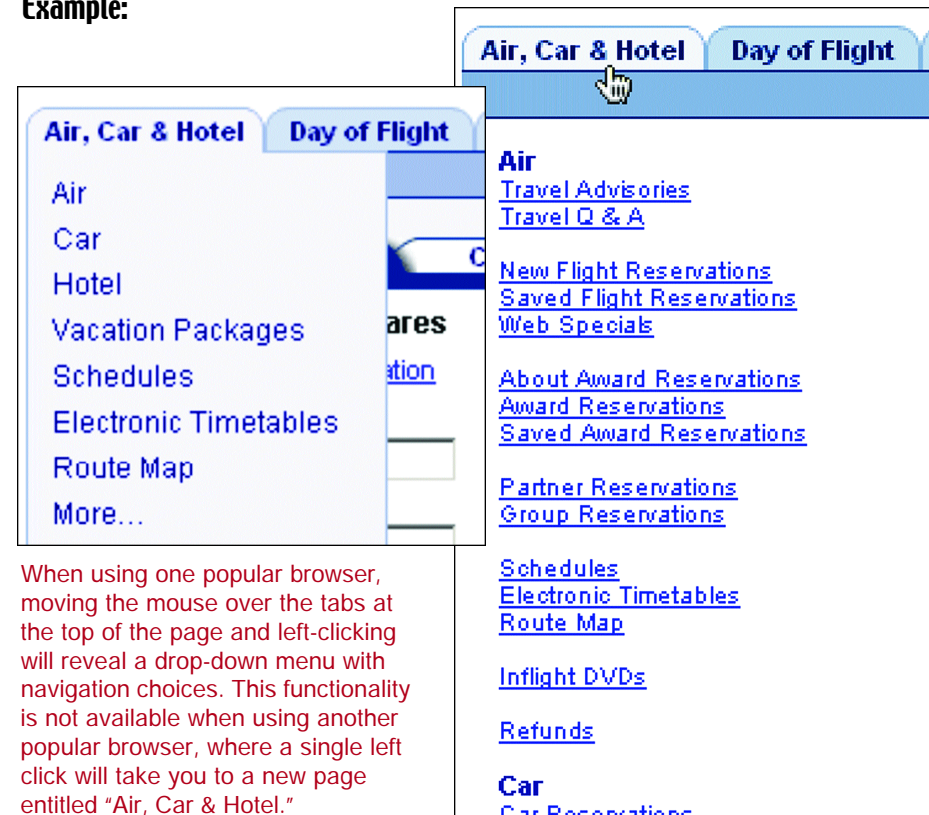
4:2 Account for Browser Differences

Guideline: Do not assume that all users will have the same browser features, and will have set the same defaults.

Comments: Visually impaired users tend to select larger fonts, and some users may turn off backgrounds, use fewer colors, or use font overrides. The designer should find out what settings most users are using, and specify on the website exactly what assumptions were made about the browser settings.

Sources: Evans, 1998; Levine, 1996.

Example:



Relative Importance:
12340
Strength of Evidence:
12000

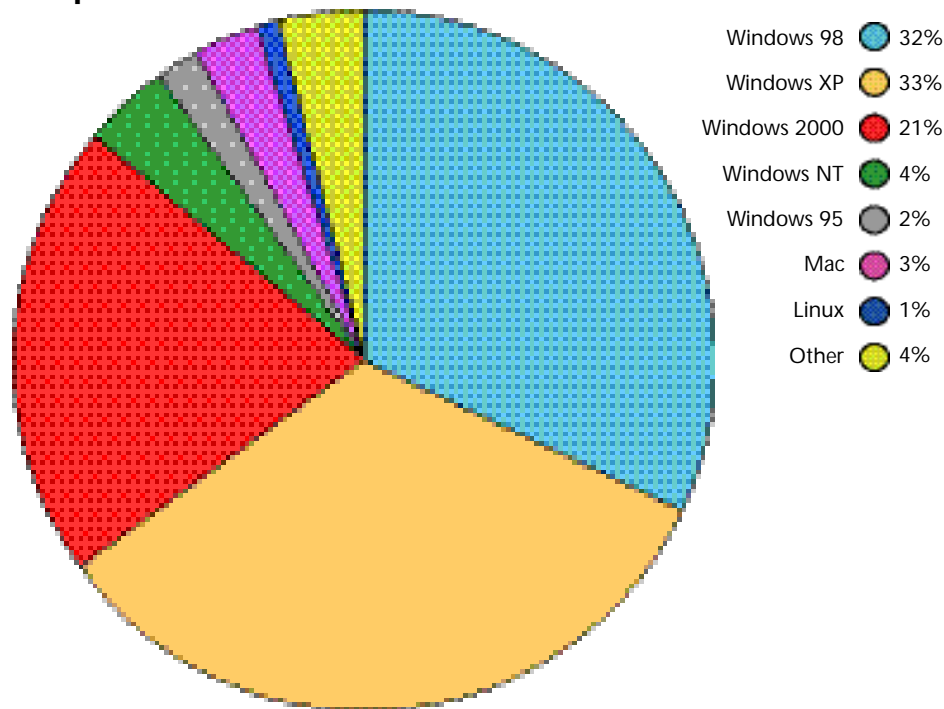
4:3 Design for Popular Operating Systems

Guideline: Design the website so it will work well with the most popular operating systems.

Comments: Designers should attempt to accommodate ninety-five percent of all users. Ensure that all testing of a website is done using the most common operating systems.

Sources: Jupitermedia Corporation, 2003.

Example:



Operating Systems Used To Access Google
June 2003

Relative Importance:

12340

Strength of Evidence:

12000

4:4 Design for User's Typical Connection Speed

Guideline: Design for the connection speed of most users.

Comments: At work, more than two-thirds of users have high speed access and thirty-four percent are using 56K (or slower) modems. At home, more than one-third of users have high speed access. These figures are continually changing—designers should consult one of the several sources that maintain up-to-date figures.

Sources: Forrester Research, 2001; Nielsen, 1999a; Web Site Optimization, 2003.

Relative Importance:

12340

Strength of Evidence:

12000

4:5 Design for Commonly Used Screen Resolutions

Guideline: Design for monitors with the screen resolution set at 800x600 pixels.

Comments: Designers should attempt to accommodate ninety-five percent of all users. As of 2003, nearly half of users have their screen resolution set at 800x600. By designing for 800x600, designers will accommodate this most common resolution, as well as those at any higher resolution. Ensure that all testing of websites is done using the most common screen resolutions.

Sources: Evans, 1998; Jupitermedia Corporation, 2003.

Example:

Relative Importance:

12000

Strength of Evidence:

12000

Screen Resolution	Apr 02	July 02	Oct 02	Jan 03	May 03
1152x864 or greater	6% of users	7%	7%	7%	7%
1024x768	35% of users	37%	38%	40%	41%
800x600	51% of users	49%	49%	46%	46%
640x480 or less	3% of users	3%	2%	2%	2%
Other or Unknown	5% of users	4%	4%	5%	4%

The Homepage

The homepage is different from all other website

pages. A well-constructed homepage will project a good first impression to all who visit the site.

It is important to ensure that the homepage has all of the features expected of a homepage and looks like a homepage to users. A homepage should clearly communicate the site's purpose, and show all major options available on the website. Generally, the majority of the homepage should be visible 'above the fold,' and should contain a limited amount of prose text. Designers should provide easy access to the homepage from every page in the site.

Guideline: Treat your homepage as the key to conveying the quality of your site.

Comments: In terms of conveying quality, the homepage is probably the most important page on a website. One study found that when asked to find high quality websites, about half of the time participants looked only at the homepage. You will not get a second chance to make a good first impression on a user.

Sources: Amento, et al., 1999; Coney and Steehouder, 2000; Mahlke, 2002; Nielsen and Tahir, 2002.

Relative Importance:

12345

Strength of Evidence:

12340

Example: This homepage creates a positive first impression:

- Tag line increases users' understanding of site;
- Key topic areas are presented in order of importance and are easy to scan; and
- Up-to-date news stories are available.



5:2 Ensure the Homepage Looks like a Homepage

Guideline: Ensure that the homepage has the necessary characteristics to be easily perceived as a homepage.

Comments: It is important that pages 'lower' in a site are not confused with the homepage. Users have come to expect that certain actions are possible from the homepage. These actions include, among others, finding important links, accessing a site map or index, and conducting a search.

Sources: Farkas and Farkas, 2000; Ivory and Hearst, 2002; Ivory, Sinha and Hearst, 2000; Lynch and Horton, 2002; Nall, Koyani and Lafond, 2001; Nielsen and Tahir, 2002; Tullis, 2001.

Example:

Relative Importance:

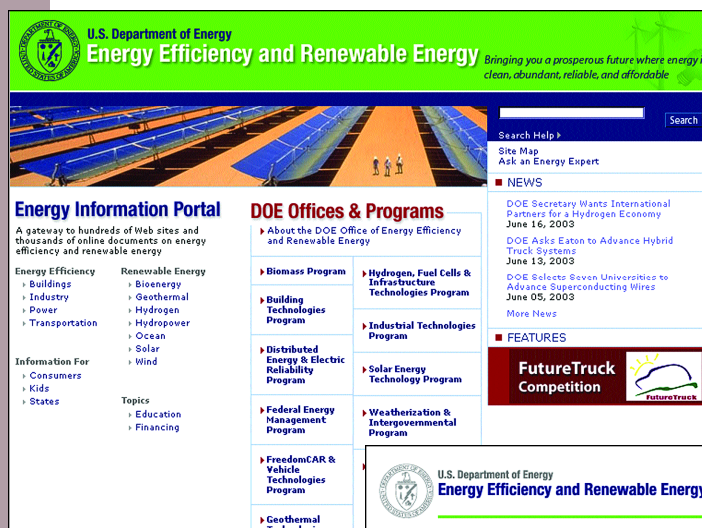
12345

Strength of Evidence:

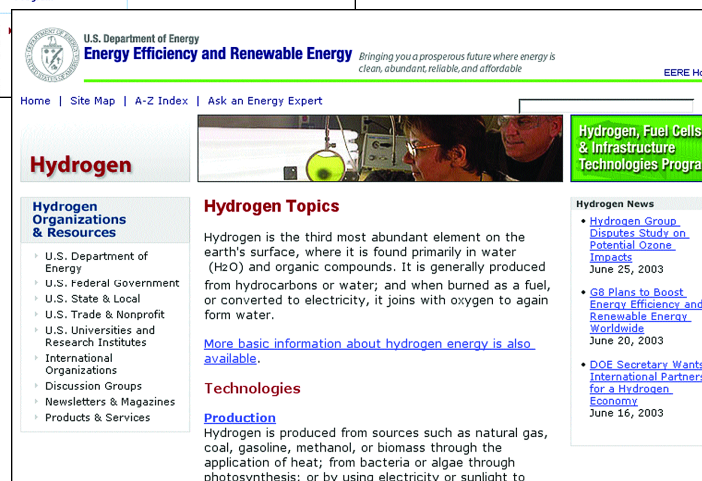
12340

This homepage has characteristics that help ensure that it is distinct from second and third tier pages:

- Masthead with tagline;
- Distinct and weighted category links listed in order of priority; and
- All major content categories are available.



The second and third tier pages use a less visually imposing masthead and specific content.



5:3 Show All Major Options on the Homepage

Guideline: Present all major options on the homepage.

Comments: Users should not be required to click down to the second or third level to discover the full breadth of options on a website. Be selective about what is placed on the homepage, and make sure the options and links presented there are the most important ones on the site.

Sources: Farkas and Farkas, 2000; Koyani, 2001a; Nielsen and Tahir, 2002; Nielsen, 2001b.

Example:

Relative Importance:

12345

Strength of Evidence:

12000



All major topic areas and categories are presented at the homepage level.

See page xxi
for detailed descriptions
of the rating scales

12340

5:4 Enable Access to the Homepage

Guideline: Enable users to access the homepage from any other page on the website.

Comments: Many users return to the homepage to begin a new task or to start a task over again. Create an easy and obvious way for users to quickly return to the homepage of the website from any point in the site.

Many sites place the organization's logo on the top of every page and link it to the homepage. While many users expect that a logo will be clickable, many other users will not realize that it is a link to the homepage. Therefore, include a link labeled "Home" near the top of the page to help those users.

Sources: Bailey, 2000b; Detweiler and Omanson, 1996; IBM, 1999; Levine, 1996; Lynch and Horton, 2002; Nielsen and Tahir, 2002; Spool, et al., 1997; Tullis, 2001.

Example:



This Web page provides links to both the main organization homepage (clickable "National Cancer Institute" logo in the upper left corner) as well as the sub-organization homepage ("Cancer Control Home" link placed in the upper right corner). These logos and their placement remain constant throughout the website.

Relative Importance:
12340

Strength of Evidence:
12300

5:5 Attend to Homepage Panel Width

Guideline: Ensure that homepage panels are of a width that will cause them to be recognized as panels.

Comments: The width of panels seems to be critical for helping users understand the overall layout of a website. In one study, users rarely selected the information in the left panel because they did not understand that it was intended to be a left panel. In a subsequent study, the panel was made narrower, which was more consistent with other left panels experienced by users. The newly designed left panel was used more.

Sources: Evans, 1998; Farkas and Farkas, 2000; Nall, Koyani and Lafond, 2001.

Example:

The width of these panels (wide enough to clearly present links and navigation information, but narrow enough so that they do not dominate the page) allow the user to recognize them as navigation and content panels.



Relative Importance:
12340

Strength of Evidence:
12300

5:6 Announce Changes to a Website

Guideline: Announce major changes to a website on the homepage—do not surprise users.

Comments: Introducing users to a redesigned website can require some preparation of expectations. Users may not know what to do when they are suddenly confronted with a new look or navigation structure. Therefore, you should communicate any planned changes to users ahead of time. Following completion of changes, tell users exactly what has changed and when the changes were made. Assure users that all previously available information will continue to be on the site.

It may also be helpful to users if you inform them of site changes at other relevant places on the website. For example, if shipping policies have changed, a notification of such on the order page should be provided.

Sources: Levine, 1996; Nall, Koyani and Lafond, 2001.

Example:

Creating Web pages that introduce a new look or changes in the navigation structure is one way of re-orienting users after a site redesign.

Relative Importance:
12340
Strength of Evidence:
12000



See page xxi
for detailed descriptions
of the rating scales

12340

5:7 Communicate the Website's Purpose

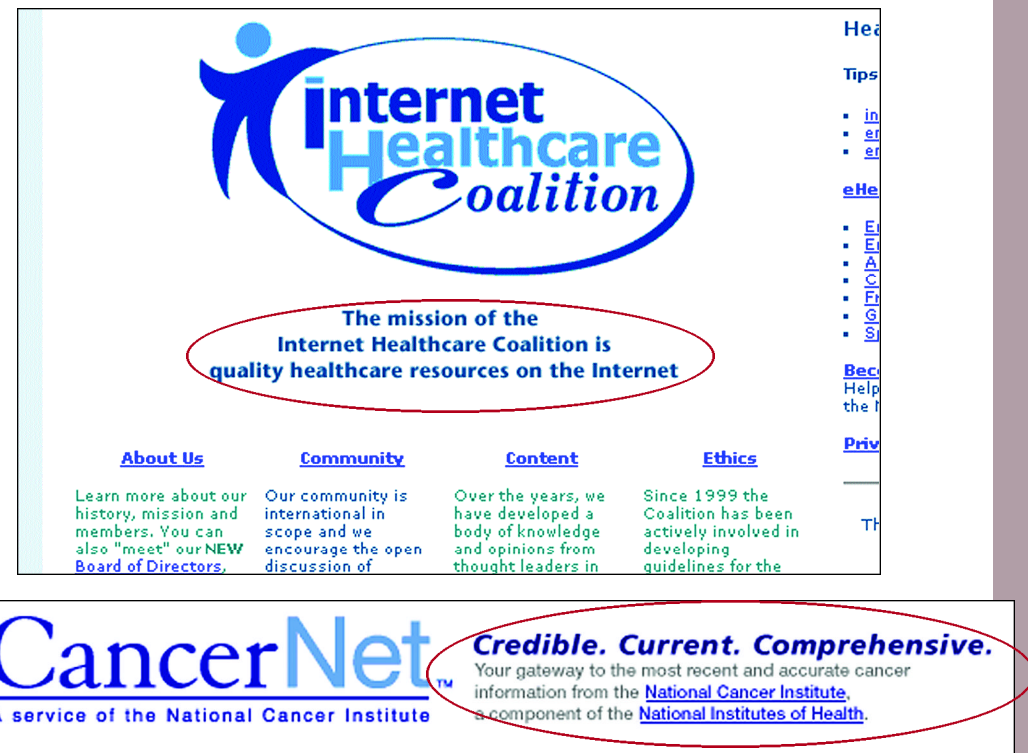
Guideline: Communicate the purpose of the website on the homepage.

Comments: Many users waste time because they misunderstand the purpose of a website. In one study, most users expected that a site would show the results of research projects, not merely descriptions of project methodology.

In some cases the purpose of a website is easily inferred. In other cases, it may need to be explicitly stated through the use of brief text or a tagline. Do not expect users to read a lot of text to determine a site's purpose.

Sources: Coney and Steehouder, 2000; Nall, Koyani and Lafond, 2001.

Example:



CancerNet
A service of the National Cancer Institute

Credible. Current. Comprehensive.
Your gateway to the most recent and accurate cancer information from the [National Cancer Institute](#), a component of the [National Institutes of Health](#).

5:8 Limit Prose Text on the Homepage

Guideline: Limit the amount of prose text on the homepage.

Comments: The first action of most users is to scan the homepage for link titles and major headings. Requiring users to read large amounts of prose text can slow them considerably, or they may avoid reading it altogether.

Sources: Bailey, Koyani and Nall, 2000; Farkas and Farkas, 2000; Morkes and Nielsen, 1998.

Example:

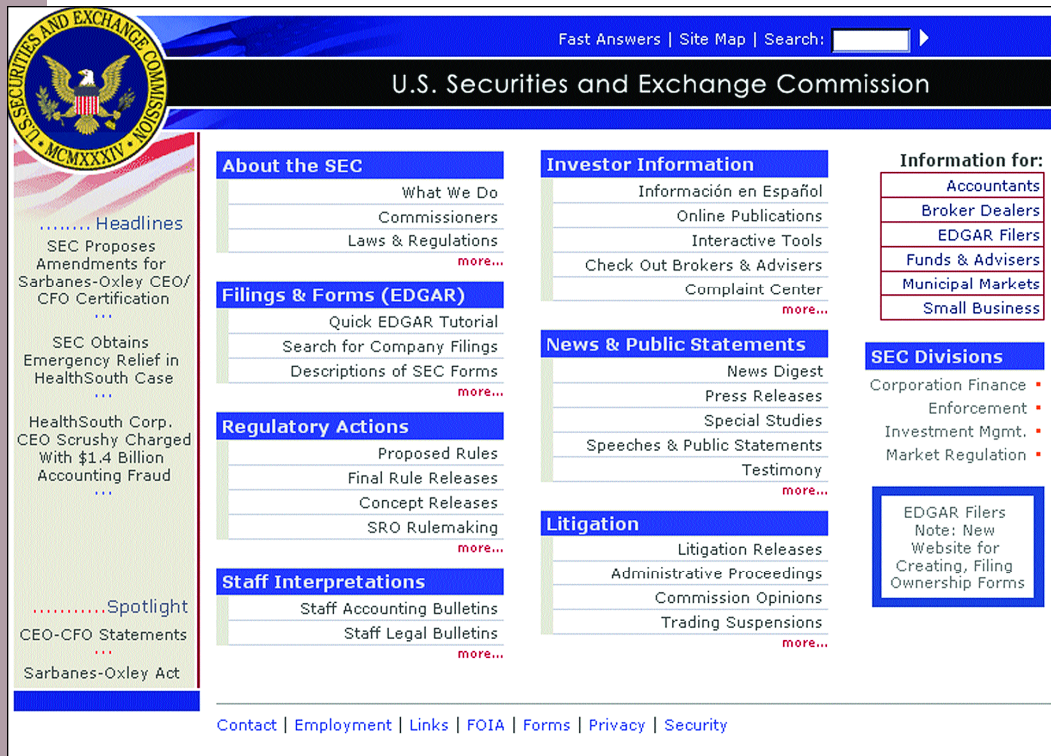
Clean, prose-free design allows users to quickly discern the primary headings and sub-headings without the distraction of paragraphs of text.

Relative Importance:

12000

Strength of Evidence:

12300



5:9 Limit Homepage Length

Guideline: Limit the homepage to one screenful of information if at all possible.

Comments: Any element on the homepage that must immediately attract the attention of users should be placed 'above the fold.' Information that cannot be seen in the first screenful may be missed altogether—this can negatively impact the effectiveness of the website. If users conclude that what they see on the visible portion of the page is not of interest, they may not bother scrolling to see the rest of the page.

Some users take a long time to scroll down 'below the fold,' indicating a reluctance to move from the first screenful to subsequent information. Older users and novices are more likely to miss information that is placed below the fold.

The dimensions for one screenful of information are based primarily on screen resolution. The following assume that users have selected an 800 x 600 pixel resolution: Maximum width = 780 pixels; Maximum height = 430 pixels.

Sources: Badre, 2002; IBM, 1999; Lynch and Horton, 2002; Nielsen and Tahir, 2002; Spyridakis, 2000.

Example:

Users can view all of the information on this homepage without scrolling.



Page Layout

All Web pages should be structured for ease of

comprehension. This includes putting items on the page in an order that reflects their relative importance. Designers should place important items consistently, usually toward the top and center of the page. All items should be appropriately aligned on the pages. It is usually a good idea to ensure that the pages show a moderate amount of white space—too much can require considerable scrolling, while too little may provide a display that looks too “busy.” It is also important to ensure that page layout does not falsely convey the top or bottom of the page, such that users stop scrolling prematurely.

When a Web page contains prose text, choose appropriate line lengths. Longer line lengths usually will elicit faster reading speed, but users tend to prefer shorter line lengths. There also are important decisions that need to be made regarding page length. Pages should be long enough to adequately convey the information, but not so long that excessive scrolling becomes a problem. If page content or length dictates scrolling, but the page table of contents needs to be accessible, then it is usually a good idea to use frames to keep the table of contents readily accessible and visible in the left panel.

Relative Importance:

12340

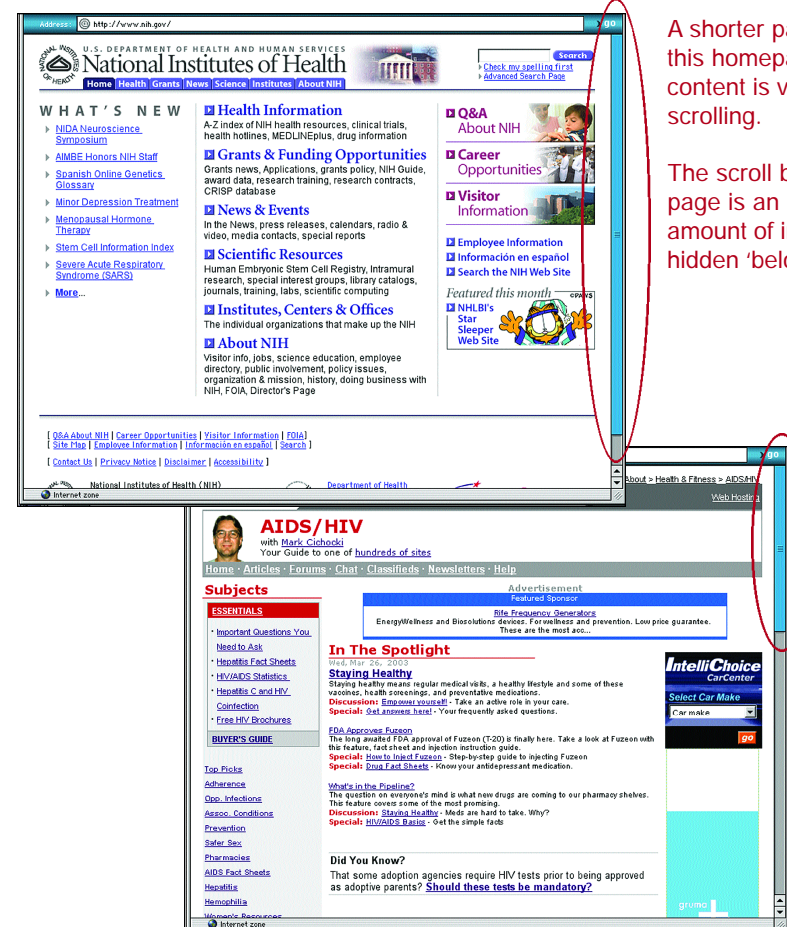
Strength of Evidence:

12300

Guideline: Make page-length decisions that support the primary use of the Web page.

Comments: In general, use shorter pages for homepages and navigation pages, and pages that need to be quickly browsed and/or read online. Use longer pages to (1) facilitate uninterrupted reading, especially on content pages; (2) match the structure of a paper counterpart; (3) simplify page maintenance (fewer Web page files to maintain); and, (4) make pages more convenient to download and print.

Sources: Bernard, Baker and Fernandez, 2002; Evans, 1998; Lynch and Horton, 2002.

Example:

6:2 Use Frames When Functions Must Remain Accessible

Guideline: Use frames when certain functions must remain visible on the screen as the user accesses other information on the site.

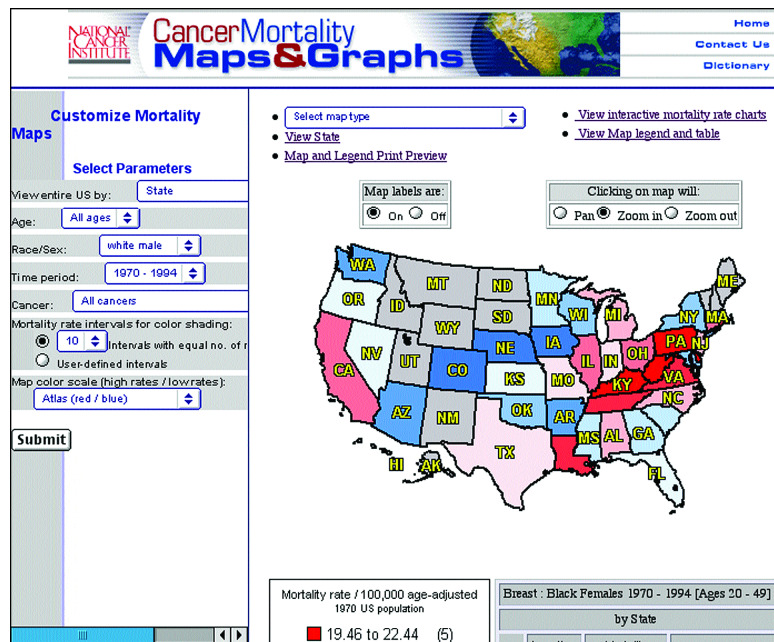
Comments: It works well to have the functional items in one frame and the items that are being acted upon in another frame. This is sometimes referred to as a 'simultaneous menu' because making changes in one frame causes the information to change in another frame. Side-by-side frames seem to work best, with the functions on the left and the information viewing area on the right.

Keep in mind that frames can be confusing to some users. More than three frames on a page can be especially confusing to infrequent and occasional users. Frames also pose problems when users attempt to print, and when searching pages.

Sources: Ashworth and Hamilton, 1997; Bernard and Hull, 2002; Bernard, Hull and Drake, 2001; Detweiler and Omanson, 1996; Kosslyn, 1994; Koyani, 2001a; Lynch and Horton, 2002; Nielsen, 1996a; Nielsen, 1999b; Powers, et al., 1961; Spool, et al., 1997.

Example:

Multi-variable charting applications are one example of an acceptable use of frames. The map of the United States in the right frame is controlled by the menu selections in the left frame. As such, the left frame remains fixed while the right frame regenerates based upon the user-defined selections in the left frame. Such use of frames allows users to continually view the menu selections, avoiding use of the Back button when changing selections and eliminating the need for users to maintain this information in their working memory.



Relative Importance:

12340

Strength of Evidence:

12340

6:3 Establish Level of Importance

Guideline: Establish a high-to-low level of importance for information and infuse this approach throughout each page on the website.

Comments: The page layout should help users find and use the most important information. Important information should appear higher on the page so users can locate it quickly. The least used information should appear toward the bottom of the page. Information should be presented in the order that is most useful to users.

Sources: Detweiler and Omanson, 1996; Evans, 1998; Kim and Yoo, 2000; Marshall, Drapeau and DiSciullo, 2001; Nall, Koyani and Lafond, 2001; Nielsen and Tahir, 2002; Nygren and Allard, 1996; Spyridakis, 2000.

Example:

Priority information and links appear in order based on users' needs. The order was determined by surveys, log analyses, and interviews.

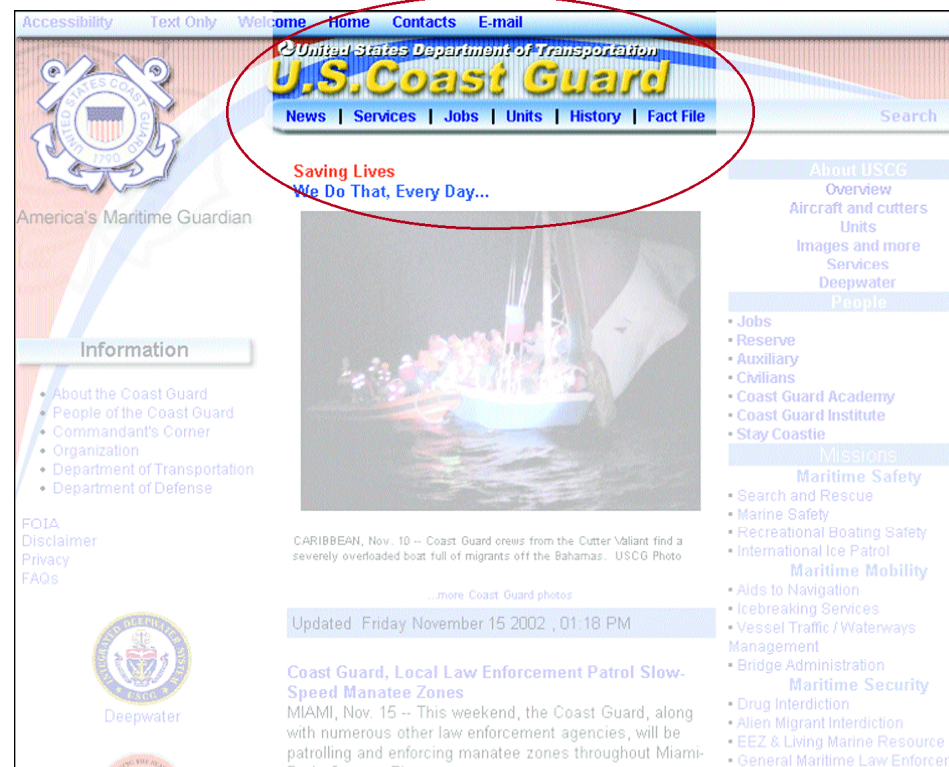
6:4 Place Important Items at Top Center

Guideline: Put the most important items at the top center of the Web page to facilitate users' finding the information.

Comments: Users generally look at the top center of a page first, then look left, then right, and finally begin systematically moving down the total Web page. All critical content and navigation options should be toward the top of the page. Particularly on navigation pages, most major choices should be visible with no or a minimum of scrolling.

Sources: Byrne, Anderson, et al., 1999; Detweiler and Omanson, 1996; Faraday, 2000; Faraday, 2001; Lewenstein, et al., 2000; Mahajan and Shneiderman, 1997; Nielsen, 1996a; Nielsen, 1999b; Nielsen, 1999c; Spyridakis, 2000.

Example: Eye-tracking studies indicate this is the area of the screen where most new users first look when a website page loads.



Relative Importance:

12300

Strength of Evidence:

12340

6:5 Place Important Items Consistently

Guideline: Put important, clickable items in the same locations, and closer to the top of the page, where their location can be better estimated.

Comments: Users will try to anticipate where common items will appear on their screen. Experienced users will begin moving their mouse to the area of the target before the eye detects the item. Users can anticipate the location of the top items much better than those farther down the page.

Sources: Badre, 2002; Bernard, 2001; Bernard, 2002; Byrne, Anderson, et al., 1999.

Example: Important items—in this case primary navigation tabs—are consistently placed at the top of each page.



Relative Importance:

12300

Strength of Evidence:

12340

See page xxi
for detailed descriptions
of the rating scales

12340

6:6 Structure for Easy Comparison

Guideline: Structure pages so that items can be easily compared when users must analyze those items to discern similarities, differences, trends, and relationships.

Comments: Users should be able to compare two or more items without having to remember one while going to another page or another place on the same page to view a different item.

Sources: Spool, et al., 1997; Tullis, 1981; Williams, 2000.

Example: This page layout is structured to easily allow users to quickly scan and compare data.

Relative Importance:

12300

Strength of Evidence:

12340

2002 Plan Comparison - FFS Benefits -

You Are Here: OPM Home > FFS Home > 2002 Plan Comparison > Benefits - Fee For Service

Click Here To Return To Your State (You are now viewing nationwide information)

Plan (acronym only)	Benefit Type	Medical/Surgical - You pay											
		Deductible		Copay (\$)/Coinsurance (%)		Hospital		Prescription Drugs		Other		Other	
		Per person	Per day	Per person	Per day	Inpatient	Outpatient	Generic	Brand name	Generic	Brand name	Generic	Brand name
Alfreds Health Plan	PPO	\$100	\$200	\$150	10%	10%	10%	10%	10%/50%	10%/50%	10%	20%	20%
Alfreds Health Plan	Non PPO	\$300	\$200	\$250	30%	30%	30%	30%	10%/50% +	10%/50% +	10%	20%	20%
Blue Cross and Blue Shield Services Benefit Plan-Solo	PPO	\$775	0	0	10%	10%	10%	10%	\$7	25%	25%	\$10	20%
Blue Cross and Blue Shield Services Benefit Plan-Solo	Non PPO	\$350	0	\$200	30%	30%	30%	30%	45%	45%	45%	\$10	20%
Blue Cross and Blue Shield Services Benefit Plan-Solo	PPO	0	0	\$100/day, \$500	\$20/\$30	0	0	\$30	\$10	\$25	\$75 or 50%	\$104	\$254
Blue Cross and Blue Shield Services Benefit Plan-Solo	Non PPO	\$250	0	\$300	20%	30%	30%	20%	45%	45%	45%	\$104	\$254
GEHA Benefit Plan-High	PPO	\$100	0	0	10%	10%	10%	10%	\$5/\$30	\$15/\$30	\$15	\$10	\$25/\$40
GEHA Benefit Plan-High	Non PPO	\$300	0	0	25%	0	25%	25%	\$5 or 50%	\$15/\$30	\$15/\$30	\$10	\$35/\$50
GEHA Benefit Plan-Std	PPO	\$450	0	0	15%	15%	15%	15%	\$5	50%	50%	\$15	50%
GEHA Benefit Plan-Std	Non PPO	\$150	0	0	30%	30%	30%	30%	\$5 +	50% +	50% +	\$15	50%
Met Healthco-Benefit	PPO	\$700	\$250	0	10%	10%	10%	10%	25%	25%	25%	\$10	\$10
Met Healthco-Benefit	Non PPO	\$200	\$250	\$250	30%	0	0	30%	50%	50%	50%	\$10	\$45
Met Healthco-Std	PPO	\$250	\$500	\$150	10%	0	0	10%	30%	30%	30%	\$10	\$40

See page xxi for detailed descriptions of the rating scales

12340

6:7 Use Moderate White Space

Guideline: Limit the amount of white space (areas without text, graphics, etc.) on pages that are used for scanning and searching.

Comments: 'Density' is the percentage of the screen filled with text and graphics. One study found that higher density is related to faster scanning, and has no impact on user accuracy or preference. Another study found that users prefer moderate amounts of white space, but the amount of white space has no impact on their searching performance. On content (i.e., text) pages, use some white space to separate paragraphs. Too much separation of items on Web pages may require users to scroll unnecessarily.

Sources: Chaparro and Bernard, 2001; Parush, Nadir and Shtub, 1998; Spool, et al., 1997; Staggers, 1993; Tullis, 1984.

Example: This page facilitates user's ability to scan for information by limiting the amount of white space.

Relative Importance:

12300

Strength of Evidence:

12340

US Department of Energy

Seattle Regional Office

What We Do

Building Technology, State and Community Programs

Who We Are

Rebuild America
Provides communities with assistance to create partnerships to help achieve their energy-related objectives. Primary focus is commercial and public facilities, public housing, and multi-family dwellings. Contact: richard.putnam@ee.doe.gov, or (206) 553-2165.

What We Do

Building Energy Codes Program
Supports upgrade of state building energy codes across the country. The DOE provides technical assistance, financial assistance, tools, and training to help in this effort. Contact: molly.dwyer@ee.doe.gov, or (206) 553-7837.

Regional Partners

State Energy Programs
Provides financial assistance to state energy and territorial offices to support the delivery of energy efficiency and renewable energy products and services. Contact: laurie.brown@ee.doe.gov, or (206) 553-2158.

Calendar of Events

Funding and Grant Links

Weatherization Assistance Program
Provides financial assistance to local agencies through the states and territories for the weatherization of low-income households. Contact: carole.gates@ee.doe.gov, or (206) 553-1165.

Our Staff

Open Solicitations

What's News

Federal Energy Management Program

Federal Energy Management Program
Assists federal agencies in reducing energy and water use in their buildings and operations. The program includes technical assistance and help for agencies in using energy-saving performance contracts. Some program materials advise federal agencies on energy-saving measures that are transferable to state and local facilities. Contact: arun.jhaveri@ee.doe.gov, (206) 553-2152 or cherisaveri@ee.doe.gov, (206) 553-7838.

Industrial Technologies Programs

Industrial Assessment Centers
Provide free energy and environmental audits at 30 universities across the country for small and medium industries. Industries benefit by receiving recommendations on controlling costs and improving energy efficiency, as well as opportunities for productivity improvements and waste reduction. Contact: Charles Glaser, (202) 586-1298.

6:8 Align Items on a Page

Guideline: Visually align page elements, either vertically or horizontally.

Comments: Users prefer consistent alignments for items such as text blocks, rows, columns, check boxes, radio buttons, data entry fields, etc. Use consistent alignments across all Web pages.

Sources: Ausubel, 1968; Bailey, 1996; Esperet, 1996; Fowler, 1998; Lawless and Kulikowich, 1996; Marcus, Smilonich and Thompson, 1995; Mayer, Dyck and Cook, 1984; Parush, Nadir and Shtub, 1998; Spyridakis, 2000; Trollip and Sales, 1986; Voss, et al., 1986; Williams, 1994; Williams, 2000.

Example: The design of these list columns makes them extremely difficult to scan, and thus will slow users' attempts to find information.

Relative Importance:
12300
Strength of Evidence:
12345

critical technologies related to weapons of mass destruction. We have developed computerized information systems for use within the US government that allow rapid dissemination of accurate information needed for export control and policy decisions.

NIS-8 also studies critical technologies that could impact the energy, economic, environmental, or military security of the United States.

NIS-8 expertise includes, but is not limited to, the following:

- Nuclear materials production processes.
- Materials protection, control, and accountability (MPC&A).
- Nuclear weapon design, production, and testing.
- Chemistry and materials science.
- Stockpile surveillance.
- Imagery and multispectral analyses.
- Advanced energy technologies.

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- [Track & Confirm Delivery](#)

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- [Pickup & Drop-offs](#)
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- [Do Global Business](#)
- [Real Success Stories](#)
- [Other Useful Links](#)

See page xxi for detailed descriptions of the rating scales

6:9 Choose Appropriate Line Lengths

Relative Importance:
12000
Strength of Evidence:
12345

Guideline: If reading speed is most important, use longer line lengths (75-100 characters per line). If acceptance of the website is most important, use shorter line lengths (fifty characters per line).

Comments: When designing, first determine if performance or preference is most important. Users read faster when line lengths are long. However, they tend to prefer shorter line lengths, even though reading shorter lines generally slows overall reading speed. One study found that line lengths of about twenty characters reliably slowed reading speed.

When space for text display is limited, display a few longer lines of text rather than many shorter lines of text. Always display continuous text in columns containing at least fifty characters per line.

Research done using a paper-based document found that medium line length was read fastest.

Sources: Duchnicky and Kolers, 1983; Dyson and Haselgrove, 2000; Dyson and Haselgrove, 2001; Dyson and Kipping, 1998; Evans, 1998; Paterson and Tinker, 1940b; Rehe, 1979; Smith and Mosier, 1986; Tinker and Paterson, 1929; Tullis, 1988; Youngman and Scharff, 1999.

Example: Formatting text into narrow columns with very short line lengths will slow users' reading speeds.

About Us

Learn more about our history, mission and members. You can also "meet" our NEW Board of Directors, and our advisors in this section. If you are interested in learning more about us, please see how to contact us here.

Community

Our community is international in scope and we encourage the open discussion of viewpoints. Enter here if you wish to become a member or a sponsor or learn about our

Content

Over the years, we have developed a body of knowledge and opinions from thought leaders in the areas of online privacy, ethics and the use of technology to improve health care. In this area you

Ethics

Since 1999 the Coalition has been actively involved in developing guidelines for the ethical use of the Internet in health care. Here you can find information about our eHealth

Interagency Working Group on Assistive Technology Mobility Devices

Memorandum for the Secretary of Education, Health and Human Services, Labor, and the Commissioner of Social Security

When President George H. W. Bush signed the Americans with Disabilities Act of 1990, America opened its door to a new age for people with disabilities. Although much progress has been made since then, significant challenges remain for individuals with disabilities who seek full participation in American society.

My Administration is committed to increasing education and employment opportunities for individuals with disabilities. My New Freedom initiative strives to provide people with disabilities increased opportunities to lead more independent lives by expanding education and job opportunities, and by ensuring that the latest technologies, which often make education and employment possible, are readily available.

Often, individuals with disabilities require assistive technology mobility devices such as powered wheelchairs and scooters in order to access education, training, and competitive employment. While there are several Federal programs, as well as State and local efforts, that help individuals with disabilities obtain these and other assistive technologies, they are not adequately coordinated. Other Federal programs provide funding of assistive technology mobility devices for medical purposes, but

Formatting text like this—roughly 100 characters per line—elicits faster reading speeds.

6:10 Avoid Scroll Stoppers

Guideline: Ensure that the location of headings and other page elements does not create the illusion that users have reached the top or bottom of a page when they have not.

Relative Importance:

12000

Strength of Evidence:

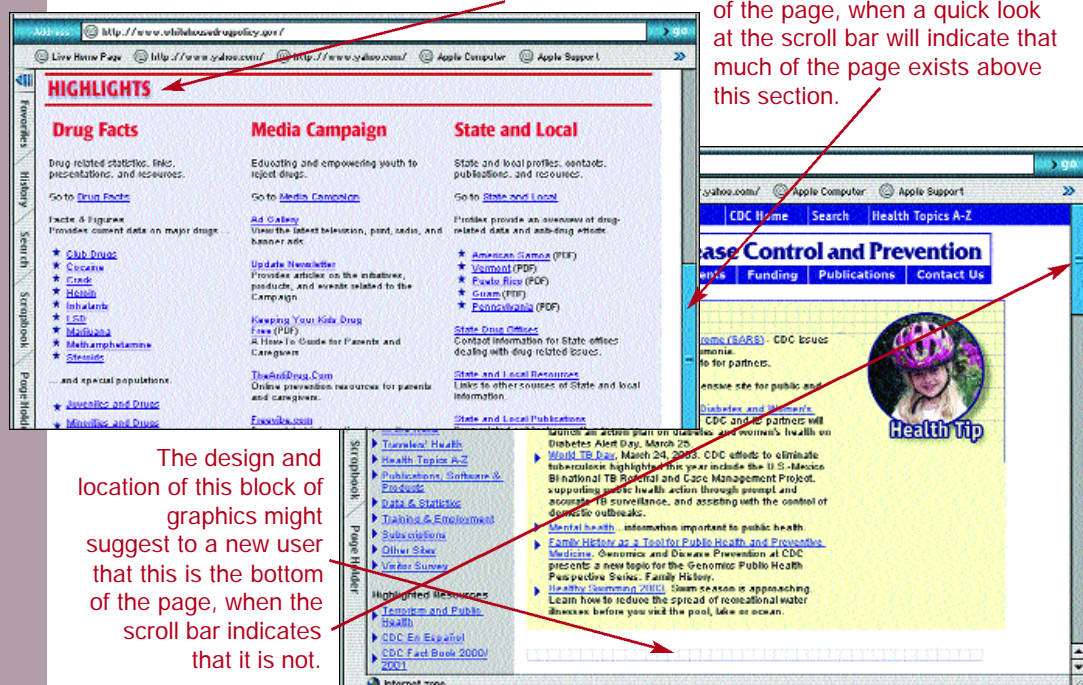
12340

Comments: In one study, three headings were positioned in the center of a page below a section of introductory text—the headings were located about one inch below the navigation tabs. When users scrolled up the page from the bottom and encountered these headings, they tended to stop, thinking the headings indicated the top of the page.

Similarly, users have been found to not scroll to the true bottom of a page to find a link because they encountered a block of text in a very small font size. This small type led users to believe that they were at the true bottom of the page. Other elements that may stop users' scrolling include horizontal lines, inappropriate placement of 'widgets,' and cessation of background color.

Sources: Bailey, Koyani and Nall, 2000; Ivory, Sinha and Hearst, 2000; Marshall, Drapeau and DiSciullo, 2001; Nygren and Allard, 1996; Spool, Klee and Schroeder, 2000; Spool, et al., 1997.

Example: When scrolling up the page, the design of this header (bold, shadowed, and bordered by bars) might suggest that the user has reached the top of the page, when a quick look at the scroll bar will indicate that much of the page exists above this section.



The design and location of this block of graphics might suggest to a new user that this is the bottom of the page, when the scroll bar indicates that it is not.

Navigation

Navigation refers to the method used to find

information within a website. A navigation page is used primarily to help users locate and link to destination pages. A website's navigation scheme and features should allow users to find and access information effectively and efficiently. When possible, this means designers should keep navigation-only pages short. Designers should include site maps, and provide effective feedback on the user's location within the site.

To facilitate navigation, designers should differentiate and group navigation elements and use appropriate menu types. It is also important to use descriptive tab labels, provide a clickable list of page contents on long pages, and add 'glosses' where they will help users select the correct link. In well-designed sites, users do not get trapped in dead-end pages.

7:1 Provide Feedback on Users' Location

Guideline: Provide feedback to let users know where they are in the website.

Comments: Feedback provides users with the information they need to understand where they are within the website, and for proceeding to the next activity. Examples of feedback include providing path and hierarchy information (i.e., 'breadcrumbs'), matching link text to the destination page's heading, and creating URLs that relate to the user's location on the site. Other forms of feedback include changing the color of a link that has been clicked (suggesting that destination has been visited), and using other visual cues to indicate the active portion of the screen.

Sources: Evans, 1998; Farkas and Farkas, 2000; IBM, 1999; Lynch and Horton, 2002; Marchionini, 1995; Nielsen and Tahir, 2002; Spool, et al., 1997.

Example:

Relative Importance:

12345

Strength of Evidence:

12000

This box is used to designate the section of the website that is currently being viewed.

Color coding the pages and navigation menus provides effective feedback to the user about their location in the website.

7:2 Use a Clickable 'List of Contents' on Long Pages

Guideline: On long pages, provide a 'list of contents' with links that take users to the corresponding content farther down the page.

Comments: For long pages with several distinct sections that are not visible from the first screenful, add a short, clickable list of the sections (sometimes called 'anchor' or 'within-page' links) at the top of the page. 'Anchor links' can serve two purposes: they provide an outline of the page so users can quickly determine if it contains the desired information, and they allow users to quickly navigate to specific information.

Since 'anchor links' enable a direct link to content below the first screenful, they are also useful for getting users to specific information quickly when they arrive from a completely different page.

Sources: Bieber, 1997; Farkas and Farkas, 2000; Haas and Grams, 1998; Levine, 1996; Nall, Koyani and Lafond, 2001; Spool, et al., 1997; Spyridakis, 2000; Williams, 2000; Zimmerman, Slater and Kendall, 2001.

Example:

Contents

- [Abstract](#)
- [Executive Summary](#)
- [Introduction](#)
- [Uses and Benefits of Technology Roadmapping](#)
- [What is Technology Roadmapping?](#)
- [What is a Technology Roadmap?](#)
- [Types of Technology Roadmaps](#)
- [Planning and Business Development Context for Technology Roadmapping](#)
- [Knowledge and Skills Required for Technology Roadmapping](#)
- [Technology Roadmapping Process](#)

What is Technology Roadmapping?

Technology roadmapping is a needs-driven technology planning process to help select, and develop technology alternatives to satisfy a set of product needs. It together a team of experts to develop a framework for organizing and presenting technology-planning information to make the appropriate technology investment to leverage those investments. (For an example of this teaming process at the see Garcia, Introduction to Technology Roadmapping: The Semiconductor Industry Association's Technology Roadmapping Process.)

Given a set of needs, the technology roadmapping process provides a way to organize, and present information about the critical system requirements and targets that must be satisfied by certain time frames. It also identifies technology to be developed to meet those targets. Finally, it provides the information needed trade-offs among different technology alternatives.

Roadmapping can be done at either of two levels - industry or corporate. These different commitments in terms of time, cost, level of effort, and complexity. How levels the resulting roadmaps have the same structure - needs, critical system requirements and targets, technology areas, technology drivers and targets, technology alternatives, recommended alternatives or paths, and a roadmap report - although with different detail. Technology roadmapping within a national laboratory is essentially corporate roadmapping, although a national laboratory may participate in an industry roadmapping process.

[Back to Contents](#)

What is a Technology Roadmap?

A technology roadmap is the document that is generated by the technology roadmapping process. It identifies (for a set of product needs) the critical system requirements and process performance targets, and the technology alternatives and milestones those targets. In effect, a technology roadmap identifies alternate technology "meeting certain performance objectives. A single path may be selected and a path followed. If there is high uncertainty or risk, then multiple paths may be selected and pursued concurrently. The roadmap identifies precise objectives and helps focus resources on critical technologies that are needed to meet those objectives. This focusing is because it allows increasingly limited R&D investments to be used more effectively.

[Back to Contents](#)

Types of Technology Roadmaps

There are different types of technology roadmaps. The product technology roadmap by product/process needs. Since the product technology roadmap is the focus is usually referred to simply as a technology roadmap.

Another type of technology roadmap, which is used by some corporations, is a technology roadmap. An emerging technology roadmap differs from a product technology roadmap in two ways:

7:3 Do Not Create Pages with No Navigational Options

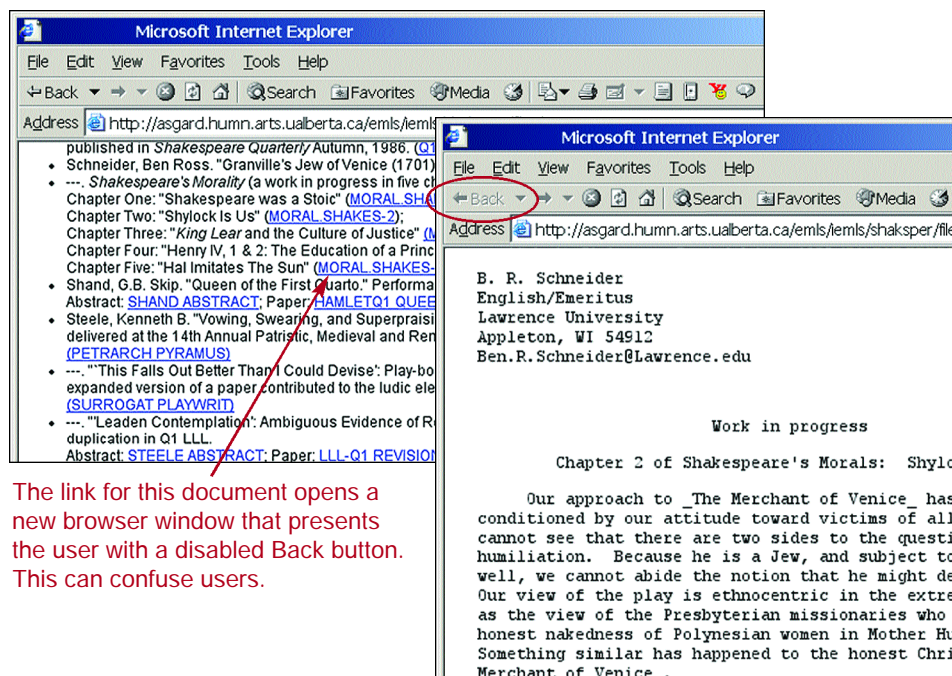
Guideline: Do not create or direct users into pages that have no navigational options.

Comments: Many Web pages contain links that open new browser windows. When these browser windows open, the Back button is disabled (in essence, the new browser window knows nothing of the user's past navigation, and thus is disabled). If the new window opens full-screen, users may not realize that they have been redirected to another window, and may become frustrated because they cannot press Back to return to the previous page. If such links are incorporated into a website, the newly-opened window should contain a prominent action control that will close the window and return the user to the original browser window.

In addition, designers should not create Web pages that disable the browser's Back button. Disabling the Back button can result in confusion and frustration for users, and drastically inhibits their navigation.

Sources: Detweiler and Omanson, 1996; Lynch and Horton, 2002; Spool, et al., 1997; Tullis, 2001; Zimmerman, Slater and Kendall, 2001.

Example:



The link for this document opens a new browser window that presents the user with a disabled Back button. This can confuse users.

Relative Importance:

12340

Strength of Evidence:

12000

7:4 Differentiate and Group Navigation Elements

Guideline: Clearly differentiate navigation elements from one another, but group and place them in a consistent and easy to find place on each page.

Comments: Create a common, website-wide navigational scheme to help users learn and understand the structure of your website. Use the same navigation scheme on all pages by consistently locating tabs, headings, lists, search, site map, etc. Locate critical navigation elements in places that will suggest clickability (e.g., lists of words in the left or right panels are generally assumed to be links).

Make navigational elements different enough from one another so that users will be able to understand the difference in their meaning and destination. Grouping reduces the amount of time that users need to locate and identify navigation elements.

Sources: Bailey, 2000b; Detweiler and Omanson, 1996; Evans, 1998; Farkas and Farkas, 2000; Koyani and Nall, 1999; Lynch and Horton, 2002; Nielsen and Tahir, 2002; Niemela and Saarinen, 2000.

Example:



Navigation elements are grouped (high-level topic areas across the top of the page) and consistently placed across the website.

See page xxi for detailed descriptions of the rating scales

12340

7:5 Use Descriptive Tab Labels

Guideline: Ensure that tab labels are clearly descriptive of their function or destination.

Comments: Users like tabs when they have labels that are descriptive enough to allow error-free selections. When tab labels cannot be made clear because of the lack of space, do not use tabs.

Sources: Allinson and Hammond, 1999; Badre, 2002; Koyani, 2001b.

Example:

These tab labels clearly describe the types of information a user can expect to find on the destination pages.



These tab labels are not as descriptive which leaves the user in doubt about the type of information available on the destination pages.



Relative Importance:
12340
Strength of Evidence:
12300

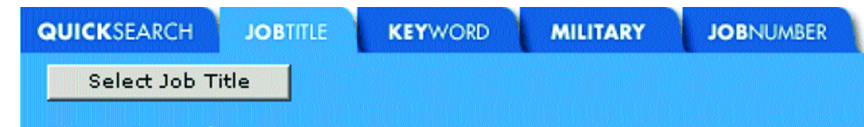
7:6 Present Tabs Effectively

Guideline: Ensure that navigation tabs are located at the top of the page, and look like clickable versions of real-world tabs.

Comments: Users can be confused about the use of tabs when they do not look like real-world tabs. Real-world tabs are those that resemble the ones found in a file drawer. One study showed that users are more likely to find and click appropriately on tabs that look like real-world tabs.

Sources: Bailey, Koyani and Nall, 2000; Kim, 1998.

Example: These clickable tabs look just like tabs found in office filing cabinets.



The design of these navigation tabs provides few clues to suggest that they are clickable until a user mouses-over them. Mousing-over is a slow and inefficient way for users to discover navigation elements.



Relative Importance:
12300
Strength of Evidence:
12300

7:7 Use Site Maps

Guideline: Use site maps for websites that have many pages.

Comments: Site maps provide an overview of the website. They may display the hierarchy of the website, may be designed to resemble a traditional table of contents, or may be a simple index.

Some studies suggest that site maps do not necessarily improve users' mental representations of a website. Also, one study reported that if a site map does not reflect users' (or the domain's) conceptual structure, then the utility of the map is lessened.

Sources: Ashworth and Hamilton, 1997; Billingsley, 1982; Detweiler and Omanson, 1996; Dias and Sousa, 1997; Farkas and Farkas, 2000; Farris, Jones and Elgin, 2001; Kandogan and Shneiderman, 1997; Kim and Hirtle, 1995; McDonald and Stevenson, 1998; McEneaney, 2001; Nielsen, 1996a; Nielsen, 1997a; Nielsen, 1999b; Nielsen, 1999c; Nielsen, 1999d; Stanton, Taylor and Tweedie, 1992; Tullis, 2001; Utting and Yankelovich, 1989.

Example:



This site map effectively presents the site's information hierarchy.

The use of headers, subcategories, and alphabetization make this site map easy to scan.

Relative Importance:
12300
Strength of Evidence:
12340



7:8 Use Appropriate Menu Types

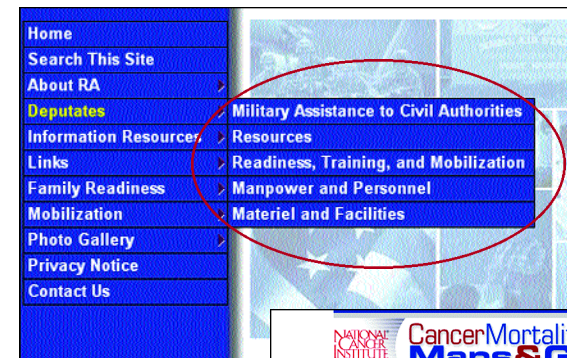
Guideline: Use 'sequential' menus for simple forward-moving tasks, and use 'simultaneous' menus for tasks that would otherwise require numerous uses of the Back button.

Comments: Most websites use familiar 'sequential' menus that require items to be selected from a series of menus in some predetermined order. After each selection is made, another menu opens. The final choice is constrained by the sum total of all previous choices.

Simultaneous menus display choices from multiple levels in the menu hierarchy, providing users with the ability to make choices from the menu in any order. Simultaneous menus are often presented in frames, and are best employed in situations where users would have to make extensive use of the Back button if presented with a sequential menu.

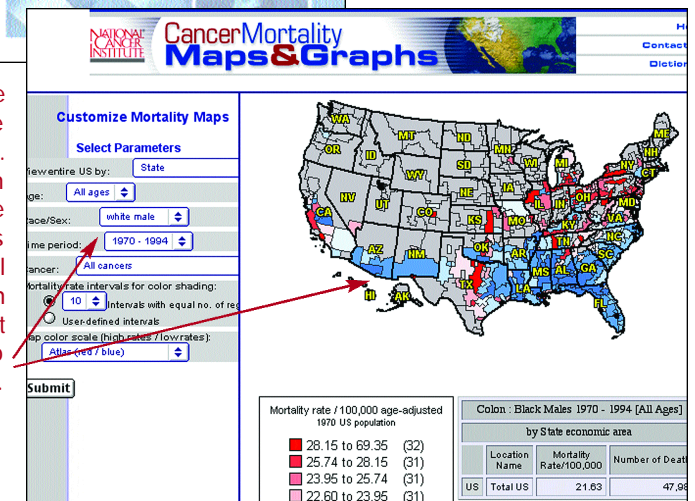
Sources: Card, Moran and Newell, 1980a; Hochheiser and Shneiderman, 2000.

Example:



This is an example of a 'sequential' menu. In this case, mousing-over "Deputates" invokes the circled sub-menu.

This is a good example of when to use 'simultaneous' menus. The user can repetitively manipulate the many variables shown in the left panel and view the results on the map in the right panel without having to use the Back button.



See page xxi for detailed descriptions of the rating scales

12340

7:9 Keep Navigation-only Pages Short

Guideline: Do not require users to scroll purely navigational pages.

Comments: Ideally, navigation-only pages should contain no more than one screenful of information. Users should not need to scroll the page, even a small distance. One study showed that users considered the bottom of one screenful as the end of a page, and they did not scroll further to find additional navigational options.

Sources: Piolat, Roussey and Thunin, 1998; Schwarz, Beldie and Pastoor, 1983; Zaphiris, 2000.

Example: Users can view all of the information on this navigation page without scrolling.



Relative Importance:
12000
Strength of Evidence:
12340

7:10 Use 'Glosses' to Assist Navigation

Guideline: Provide 'glosses' to help users select correct links.

Comments: 'Glosses' are short phrases of information that pop-up when a user places his or her mouse pointer close to a link. It provides a preview to information behind a link. Users prefer the preview information to be located close to the link, but not placed such that it disturbs the primary text. However, designers should not rely on the 'gloss' to compensate for poorly labeled links.

Sources: Evans, 1998; Farkas and Farkas, 2000; Zellweger, et al., 2000.

Example:



When a user mouses-over the "Office of Trust Records (OTR)" link, the circled text appears.

Scrolling and Paging

Designers must decide, early in the design process,

whether to create long pages that require extensive scrolling or shorter pages that will require users to move frequently from page to page (an activity referred to as paging). This decision will be based on considerations of the primary users and the type of tasks being performed. For example, older users tend to scroll more slowly than younger users; therefore, long scrolling pages may slow them down considerably. As another example, some tasks that require users to remember where information is located on a page may benefit from paging, while many reading tasks benefit from scrolling.

Generally, designers should ensure that users can move from page-to-page as efficiently as possible. If designers are unable to decide between paging and scrolling, it is usually better to provide several shorter pages rather than one or two longer pages. The findings of usability testing should help confirm or negate that decision.

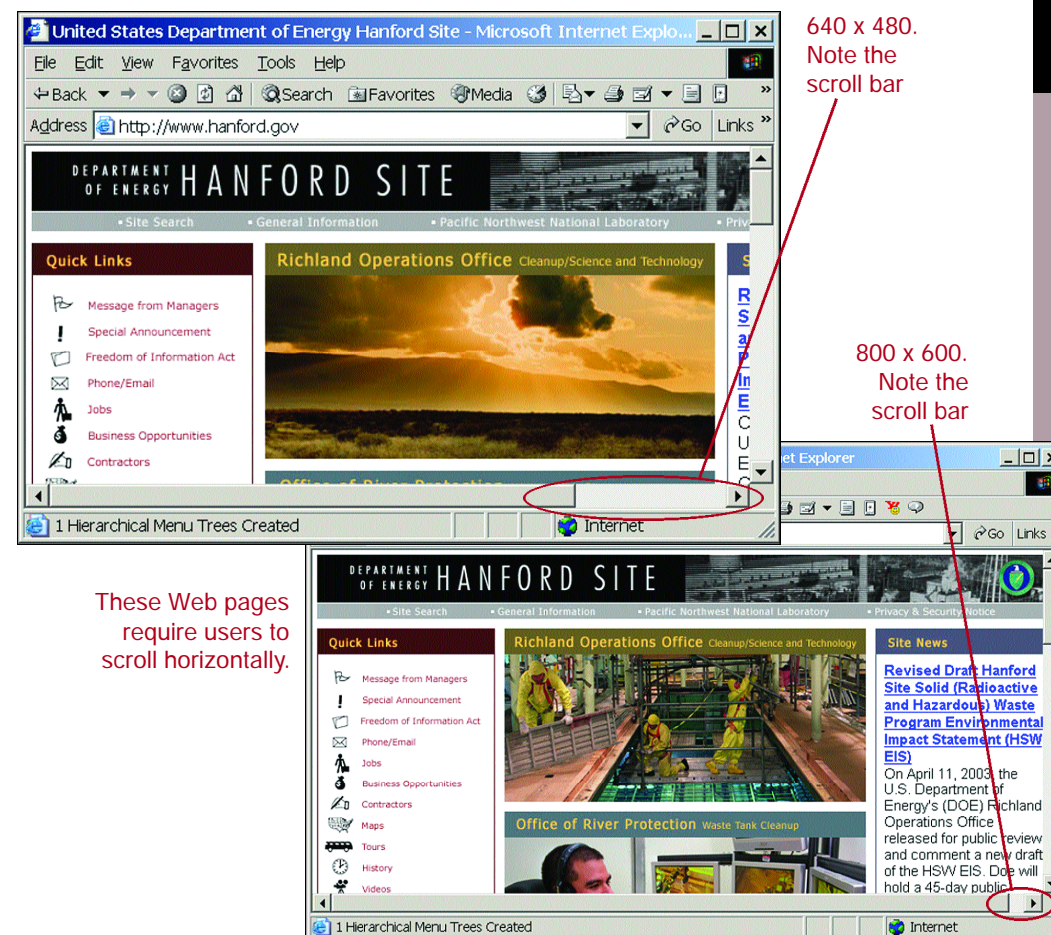
When scrolling is used, a website should be designed to allow the fastest possible scrolling. Users only should have to scroll through a few screenfuls, and not lengthy pages. Designers should never require users to scroll horizontally.

Guideline: Use an appropriate page layout to eliminate the need for users to scroll horizontally.

Comments: Horizontal scrolling is a slow and tedious way to view an entire screen. Common page layouts including fluid and left-justified may require some users to scroll horizontally if their monitor resolution or size is smaller than that used by designers.

Sources: Bernard and Larsen, 2001; Lynch and Horton, 2002; Nielsen and Tahir, 2002; Spyridakis, 2000; Williams, 2000.

Example:



These Web pages
require users to
scroll horizontally.

See page xxi
for detailed descriptions
of the rating scales

8:2 Use Scrolling Pages For Reading Comprehension

Guideline: Use longer, scrolling pages when users are reading for comprehension.

Comments: Make the trade off between paging and scrolling by taking into consideration that retrieving new linked pages introduces a delay that can interrupt users' thought processes. Scrolling allows readers to advance in the text without losing the context of the message as may occur when they are required to follow links.

However, with pages that have fast loading times, there is no reliable difference between scrolling and paging when people are reading for comprehension. For example, one study showed that paging participants construct better mental representations of the text as a whole, and are better at remembering the main ideas and later locating relevant information on a page. In one study, paging was preferred by inexperienced users.

Sources: Byrne, John, et al., 1999; Campbell and Maglio, 1999; Piolat, Roussey and Thunin, 1998; Schwarz, Beldie and Pastoor, 1983; Spool, et al., 1997; Spyridakis, 2000.

Relative Importance:



Strength of Evidence:



8:3 Use Paging Rather Than Scrolling

Guideline: If users' system response times are reasonably fast, use paging rather than scrolling.

Comments: Users should be able to move from page to page by selecting links and without having to scroll to find important information.

Sources: Nielsen, 1997e; Piolat, Roussey and Thunin, 1998; Schwarz, Beldie and Pastoor, 1983.

Relative Importance:



Strength of Evidence:



See page xxi
for detailed descriptions
of the rating scales



8:4 Scroll Fewer Screenfuls

Guideline: If users are looking for specific information, break up the information into smaller portions (shorter pages).

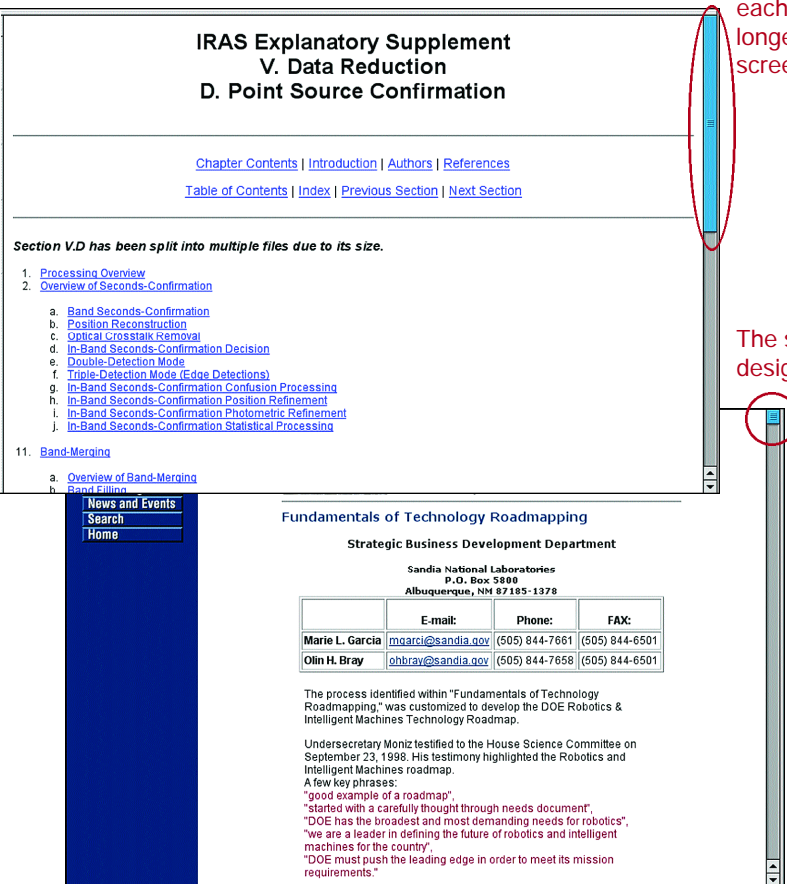
Comments: For many websites, users deal best with smaller, well-organized pages of information rather than lengthy pages because scrolling can take a lot of time. Older users tend to scroll much more slowly than younger users. One study found that Internet users spend about thirteen percent of their time scrolling within-pages. Even though each event takes little time, cumulative scrolling adds significant time.

Sources: Detweiler and Omanson, 1996; Lynch and Horton, 2002; Nielsen, 1996a; Spool, et al., 1997; Spyridakis, 2000.

Example:

Good design of a long, content-rich document. This single document is divided into numerous sections, resulting in

each page being no longer than four screenfuls.



The single-page design of this document requires users to scroll more than twenty-seven screenfuls.

8:5 Facilitate Rapid Scrolling

Guideline: Facilitate fast scrolling by highlighting major items.

Comments: Web pages will move quickly or slowly depending on how users elect to scroll. Some users click on the arrows at the ends of the scroll bar, which can be slow but does allow most information to be read during the scrolling process. Other users drag the scroll box, which tends to be much faster. When the scroll box is dragged, the information may move too fast on the screen for users to read prose text, but they can read major headings that are well-designed and clearly placed.

Sources: Bailey, Koyani and Nall, 2000.

Example:

Bold, large text and an accompanying graphic are effectively used to draw the user's attention during fast scrolling.

Relative Importance:



Strength of Evidence:



See page xxi
for detailed descriptions
of the rating scales



Headings, Titles, and Labels

Most users spend a considerable amount of time

scanning rather than reading information on websites. Well-designed headings help to facilitate both scanning and reading written material. Designers should strive to use unique and descriptive headings, and to use as many headings as necessary to enable users to find what they are looking for—it is usually better to use more rather than fewer headings. Headings should be used in their appropriate HTML order, and it is generally a good idea not to skip heading levels.

Designers should ensure that each page has a unique and descriptive page title. When tables are used, designers should make sure that descriptive row and column headings are included that enable users to clearly understand the information in the table. It is occasionally important to highlight certain critical information.

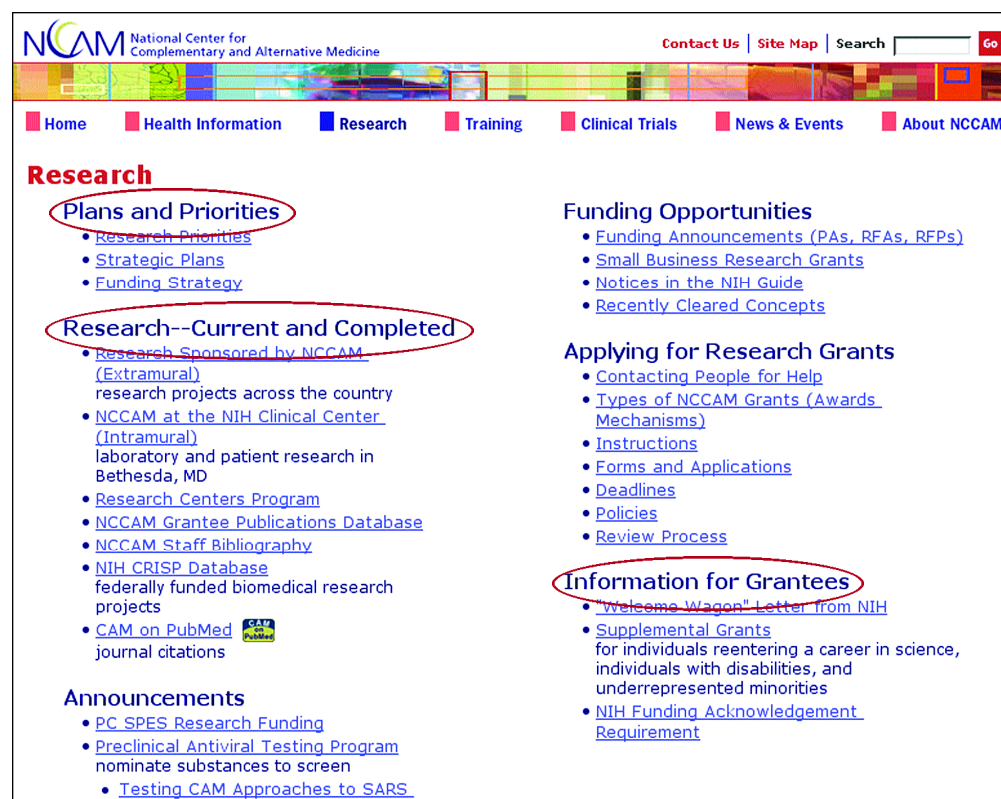
9:1 Use Clear Category Labels

Guideline: Ensure that category labels, including links, clearly reflect the information and items contained within the category.

Comments: Category titles must be understood by typical users. Users will likely have difficulty understanding vague, generalized link labels, but will find specific, detailed links and descriptors easier to use.

Sources: Evans, 1998; Landesman and Schroeder, 2000; Mahajan and Shneiderman, 1997; Marshall, Drapeau and DiSciullo, 2001; Nall, Koyani and Lafond, 2001; Spyridakis, 2000; Zimmerman, et al., 2002.

Example: These labels are clear and distinct, allowing users to distinguish paths quickly.



Relative Importance:
12345
Strength of Evidence:
12340

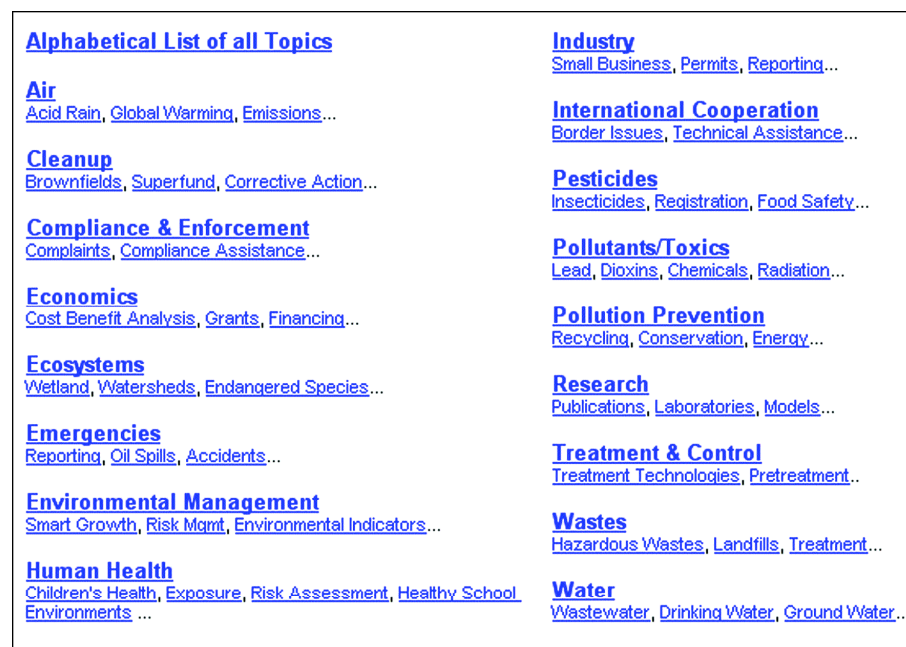
9:2 Use Unique and Descriptive Headings

Guideline: Use headings that are unique from one another and conceptually related to the content they describe.

Comments: Using poor headings (mismatches between what users were expecting and what they find) is a common problem with websites. Ensure that headings are descriptive and relate to the content they introduce. If headings are too similar to one another, users may have to hesitate and re-read to decipher the difference. Identifying the best headings may require extensive usability testing and other methods.

Sources: Bailey, Koyani and Nall, 2000; Gerhardt-Powals, 1996; Morkes and Nielsen, 1998; Williams, 2000.

Example: These headings are well-designed—they are unique from one another and descriptive of the information to which they link.



Relative Importance:
12345
Strength of Evidence:
12300

9:3 Use Descriptive Row and Column Headings

Guideline: Ensure that data tables have clear, concise, and accurate row and column headings.

Comments: Use row and column headings to indicate unique cell contents. Users require clear and concise table headings in order to make efficient and effective use of table information. Row and column headings will indicate to screen readers how data points should be labeled or identified, so the user can understand the significance of the cell in the overall scheme of the table.

Sources: Bransford and Johnson, 1972; Chisholm, Vanderheiden and Jacobs, 1999d; Detweiler and Omanson, 1996; Lynch and Horton, 2002; United States Government, 1998; Wright, 1980.

Example: An example of good table heading design. The non-expert user will have no problem understanding these descriptive row and column headers.

Connecticut Business Starts Index 2002												
Click on the 2002 Month/Year Column Header for a Monthly Detailed Report of Starts												
	Jan-2002	Feb-2002	Mar-2002	Apr-2002	May-2002	Jun-2002	Jul-2002	Aug-2002	Sep-2002	Oct-2002	Nov-2002	Dec-2002
# New Starts	2308	2176	2384	2374	2412	2147	2016	2042	1987	2188	1958	2147
% Change (MM)	12.3	-10.2	8.7	-4.2	1.8	-3	-6.5	1.3	-2.8	9.6	-12.2	1
% Change (YY)	10.2	18.7	12.3	12.3	12.7	7.3	10.5	2.7	21.6	31.8	8.8	1
Year to Date	2390	4574	6950	9332	11744	13091	15907	17948	19936	22134	24093	261
Prior Year	2154	3968	6059	8140	10247	12238	14043	16029	17585	19083	20995	238
% Change	10.2	13.2	12.9	12.0	12.7	11.9	11.7	10.7	11.0	13.0	12.9	1

An example of poor table heading design. The non-expert user will have little idea what is meant by "R.", "J.", and "Pt." Unless space constraints dictate otherwise, always use row and column headers that are descriptive enough to be understood by non-expert users.

2002 TERM OPINIONS OF THE COURT					
R.	Date	Docket	Name	J.	Pt.
35	03/26	01-1325	Brown v. Legal Foundation of Wash.	JS	538/1
34	03/25	01-1862	Woodford v. Garceau	T	538/1
33	03/25	01-1269	Cuyahoga Falls v. Buckeye Community Hope Foundation	O	538/1
32	03/10	01-963	Norfolk & Western R. Co. v. Avers	G	538/1
31	03/10	01-1572	Cook County v. United States ex rel. Chandler	DS	538/1
30	03/05	01-729	Smith v. Doe	K	538/1

Relative Importance:

12300

Strength of Evidence:

12300

9:4 Use Descriptive Headings Liberally

Guideline: Use descriptive headings liberally throughout a website.

Comments: Well-written headings are an important tool for helping users scan quickly. Headings should conceptually relate to the information or functions that follow them.

Headings should provide strong cues that orient users and inform them about page organization and structure. Headings also help classify information on a page. Each heading should be helpful in finding the desired target.

The ability to scan quickly is particularly important for older adults because they tend to stop scanning and start reading more frequently. If headings are not descriptive or plentiful enough, the user may start reading in places that do not offer the information they are seeking, thereby slowing them down unnecessarily.

Sources: Bailey, Koyani and Nall, 2000; Evans, 1998; Flower, Hayes and Swarts, 1983; Gerhardt-Powals, 1996; Hartley and Trueman, 1983; Ivory and Hearst, 2002; Ivory, Sinha and Hearst, 2000; Lorch and Lorch, 1995; Mayer, Dyck and Cook, 1984; Meyer, 1984; Morkes and Nielsen, 1998; Morrell, et al., 2002; Murphy and Mitchell, 1986; Nielsen, 1999c; Nielsen, 1999d; Schultz and Spyridakis, 2002; Spyridakis, 1989; Spyridakis, 2000; Zimmerman and Prickett, 2000.

Example:

Spending time during the design process to ensure that the site contains many carefully written headings and sub-headings will save users time as they rapidly locate the information for which they are searching.

Relative Importance:

12300

Strength of Evidence:

12345

Common Cancers

- [Bladder Cancer](#)
- [Breast Cancer](#)
- [Colon Cancer](#)
- [Endometrial Cancer](#)
- [Head and Neck Cancer](#)
- [Leukemia](#)

Childhood/Pediatric Cancers

- [Childhood Cancers Home Page](#)

Cancers by Body Location/System

- [AIDS-Related](#)
- [Bone](#)
- [Brain](#)
- [Breast](#)
- [Digestive/Gastrointestinal](#)
- [Endocrine](#)
- [Eye](#)
- [Genitourinary](#)
- [Germ Cell](#)
- [Gynecologic](#)
- [Head and Neck](#)

9:5 Provide Descriptive Page Titles

Guideline: Put a descriptive, unique, concise, and meaningfully different title on each Web page.

Comments: Title refers to the text that is in the browser title bar (this is the bar found at the very top of the browser screen). Titles are used by search engines to identify pages. If two or more pages have the same title, they cannot be differentiated by users or the Favorites capability of the browser. If users bookmark a page, they should not have to edit the title to meet the characteristics mentioned above.

Remember that some search engines only list the titles in their search results page. Using concise and meaningful titles on all pages can help orient users as they browse a page or scan hot lists and history lists for particular URLs. They can also help others as they compile links to your pages.

To avoid confusing users, make the title that appears in the heading of the browser consistent with the title in the content area of the pages.

Sources: Evans, 1998; Levine, 1996; Nielsen and Tahir, 2002; Spyridakis, 2000; Williams, 2000.

Example:

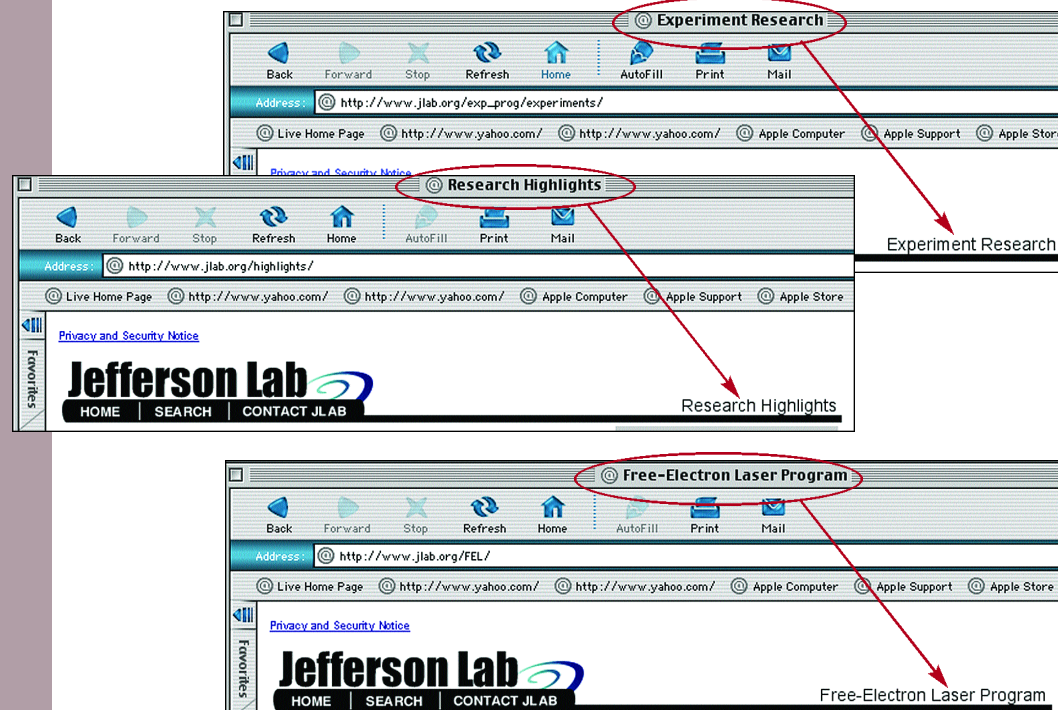
These titles are unique, concise, and consistent with the titles in the content area.

Relative Importance:

12300

Strength of Evidence:

12000



9:6 Highlight Critical Data

Guideline: Visually distinguish (i.e., highlight) important page items that require user attention, particularly when those items are displayed infrequently.

Comments: Items to highlight might include recently changed data, data exceeding acceptable limits, or data failing to meet some other defined criteria. Highlight is used here in its general sense, meaning to emphasize or make prominent. Highlighting is most effective when used sparingly, i.e. highlighting just a few items on a page that is otherwise relatively uniform in appearance.

Sources: Ahlstrom and Longo, 2001; Engel and Granda, 1975; Levine, 1996; Myers, 1985.

Example:

Formatting this text in underline, bold, and red draws attention to the most pressing deadline and instructions.

Event Status				
Event Type:	Event Id:	Event Title:	Bidding Opens:	Bids Due:
Internet Auction 269 lots, 1315 items	809	Hawaii & Alaska More Info	03/25/2003	03/27/2003
Sealed Bid 1 lots, 1 items	902	Portable Ofc Trailers Bid Package & Info	02/28/2003	03/28/2003
Internet Auction 1 lots, 1 items	908	Mattresses@St.Julien More Info	03/31/2003	04/02/2003
Internet Auction 401 lots, 5833 items	810	Norfolk & Richmond, VA More Info	03/31/2003	04/02/2003
Sealed Bid 224 lots, 684 items	812	Marianas US Naval Guam Bid Package & Info	03/28/2003	04/07/2003

Please confirm that the following information is correct.

After you have reviewed your information, click "**Edit**" to edit the information you entered or "**Submit**" to send your request.

YOUR REQUEST WILL NOT BE SENT UNTIL YOU CLICK "SUBMIT".

Edit Submit

See page xxi
for detailed descriptions
of the rating scales

12340

9:7 Provide Users with Good Ways to Reduce Options

Guideline: Provide users with good ways to reduce their available options as efficiently as possible.

Comments: Users seem willing to reduce their options quickly. Provide all options clearly so that users can focus first on selecting what they consider to be the most important option.

Sources: Bailey, Koyani and Nall, 2000.

Example: By providing three different options for selecting desired information, users can select the one most important to them.

Relative Importance:

12000

Strength of Evidence:

12000

Types of Cancer

[What You Need To Know About™ Cancer Index](#)

Information about detection, symptoms, diagnosis, and treatment of many types of c

Common Cancers

- [Bladder Cancer](#)
- [Breast Cancer](#)
- [Colon Cancer](#)
- [Endometrial Cancer](#)
- [Head and Neck Cancer](#)
- [Leukemia](#)
- [Lung Cancer](#)
- [Melanoma](#)
- [Non-Hodgkins Lymphoma](#)
- [Ovarian Cancer](#)
- [Prostate Cancer](#)
- [Rectal Cancer](#)

Childhood/Pediatric Cancers

- [Childhood Cancers Home Page](#)

Cancers by Body Location/System

- [AIDS-Related](#)
- [Bone](#)
- [Brain](#)
- [Breast](#)
- [Digestive/ Gastrointestinal](#)
- [Endocrine](#)
- [Eye](#)
- [Genitourinary](#)
- [Germ Cell](#)
- [Gynecologic](#)
- [Head and Neck](#)
- [Hematologic/ Blood](#)
- [Leukemia](#)
- [Lung](#)
- [Lymphoma](#)
- [Musculoskeletal](#)
- [Neurologic](#)
- [Pregnancy and Cancer](#)
- [Respiratory/Thoracic](#)
- [Skin](#)
- [Unknown Primary](#)

9:8 Use Headings in the Appropriate HTML Order

Guideline: Use headings in the appropriate HTML order.

Comments: Using the appropriate HTML heading order helps users get a sense of the hierarchy of information on the page. The appropriate use of H1-H3 heading tags also allows users of assistive technologies to understand the hierarchy of information.

Sources: Detweiler and Omanson, 1996; Spool, et al., 1997.

Example:

Relative Importance:

10000

Strength of Evidence:

12000



Best Practices in Funding Extramural Research

Receipt and Review H1 Investigator-Initiated Applications

Communicating about Applications Prior H2 Submission

[Communication between Program Staff and Applicants](#)
[Communication between PDs and CSR \(Use of ARA Form\)](#)
[Communication between Applicants and CSR Staff](#)

Assigning H2 Applications to Review Groups within NIH

[Processing Applications in the CSR Division of Receipt and Referral](#)
[Notifying Applicants about Assignment to Scientific Review Groups](#)

Processing Applications Assigned to NCI

[Receiving, Reco](#)
[Assigning Appli](#)
[Accepting Appli](#)
[Changing the St](#)

```
HTML: Extramural Best Practices: Receipt and...
<td align="top">
  <h1><b>Receipt and Review of Investigator-Initia
  Applications</b></h1>
  <h2>
  <a href="#1">Communicating about Applications f
  <ul class="tight">
    <p><a href="#1a">Communication between Program
    <a href="#1b"><br>
    Communication between PDs and CSR (Use of ARF
    Communication between Applicants and CSR Sta
  </ul>
  <h2>
  <a href="#2">Assigning Applications to Review (
  <ul class="tight">
    <p><a href="#2a">Processing Applications in the
```

See page xxi
for detailed descriptions
of the rating scales

12340

Linking means that users will select and click on

a hypertext link on a starting page (usually the homepage), which then causes a new page to load. Users continue toward their goal by finding and clicking on subsequent links.

To ensure that links are effectively used, designers should use meaningful link labels (making sure that link names are consistent with their targets), provide consistent clickability cues (avoiding misleading cues), and designate when links have been clicked.

Whenever possible, designers should use text for links rather than graphics. Text links usually provide much better information about the target than do graphics.

Guideline: Provide sufficient cues to clearly indicate to users that an item is clickable.

Comments: Users should not be expected to move the cursor around a website ('minesweeping') to determine what is clickable. Using the eyes to quickly survey the options is much faster than 'minesweeping.' Similarly, relying on mouseovers to designate links can confuse newer users, and slow all users as they are uncertain about which items are links.

Be consistent in your use of underlining, bullets, arrows, and other symbols such that they always indicate clickability or never suggest clickability. For example, using images as both links and as decoration slows users as it forces them to study the image to discern its clickability.

Items that are in the top center of the page, or left and right panels have a high probability of being considered links. This is particularly true if the linked element looks like a real-world tab or pushbutton.

Sources: Bailey, 2000b; Bailey, Koyani and Nall, 2000; Farkas and Farkas, 2000; Lynch and Horton, 2002; Tullis, 2001.

Example:

The screenshot shows a website navigation menu with several sections. Annotations with red arrows point to specific elements:

- Chemical Engineering** (Section Header)
- Chemistry** (Section Header)
- Health Information** (Section Header)
- Grants & Funding Opportunities** (Section Header)
- News & Events** (Section Header)
- Scientific Resources** (Section Header)
- Q&A About NIH** (Section Header)
- Career Opportunities** (Section Header)
- Visitor Information** (Section Header)
- Employee Information** (Section Header)
- Información en español** (Section Header)
- Search the NIH Web Site** (Section Header)

Annotations include:

- "Despite the non-traditional use of colors, the right-facing arrows are very strong clickability cues for users." (Pointing to right-facing arrows in the navigation menu)
- "A bulleted list of blue, underlined text. These are very strong clickability cues for users." (Pointing to a bulleted list of links under the Chemistry section)

10:2 Avoid Misleading Cues to Click

Guideline: Ensure that items that are not clickable do not have characteristics that suggest that they are clickable.

Comments: Symbols usually must be combined with at least one other cue that suggests clickability. In one study, users were observed to click on a major heading with some link characteristics, but the heading was not actually a link. However, to some users bullets and arrows may suggest clickability, even when they contain no other clickability cues (underlining, blue coloration, etc.). This slows users as they debate whether the items are links.

Sources: Bailey, Koyani and Nall, 2000; Evans, 1998; Spool, et al., 1997.

Example:

Relative Importance:
12340

Strength of Evidence:
12000

These items appear clickable, but are not. This design may confuse users because the items are underlined and are demonstratively different, and thus attract the users' attention.

This is a good example of misleading the user—blue text and underlined text placed at the top center of the page, and yet none of these are clickable.

Two of these graphics are not clickable—if a user 'mouses-over' one of them, they are likely to think that they are all not clickable. If one graphic is clickable, they should all be clickable.

10:3 Use Text for Links

Guideline: Use text links rather than image links.

Comments: In general, text links are more easily recognized as clickable. Text links usually download faster, are preferred by users, and should change colors after being selected. It is usually easier to convey a link's destination in text, rather than with the use of an image.

In one study, users showed considerable confusion regarding whether or not certain images were clickable. This was true even for images that contained words. Users could not tell if the images were clickable without placing their cursor over them ('minesweeping'). Requiring users to 'minesweep' to determine what is clickable slows them down.

Another benefit to using text links is that users with text-only and deactivated graphical browsers can see the navigation options.

Sources: Farkas and Farkas, 2000; Mobrand and Spyridakis, 2002; Nielsen, 2000; Spool, et al., 1997.

Example:

The meaning of these three images are fairly clear, even if the accompanying text was not present.

The meanings of these two image links are not obvious at first glance.

By Mail:
U.S. Department of Energy
1000 Independence Avenue, NW
Washington, DC 20585
Metro: Smithsonian

By Phone:
1-800-dial-DOE
People Locator

By E-mail:
Contact Us

By Fax:
202-586-4403

For Hearing and/or Speech Impaired:
Telephone Communication

See page xxi for detailed descriptions of the rating scales

12340

10:4 Use Meaningful Link Labels

Guideline: Use link labels and concepts that are meaningful, understandable, and easily differentiated by users rather than designers.

Comments: To avoid user confusion, use link labels that clearly differentiate one link from another. Users should be able to look at each link and learn something about the link's destination. Using terms like "Click Here" can be counterproductive.

Clear labeling is especially important as users navigate down through the available links. The more decisions that users are required to make concerning links, the more opportunities they have to make a wrong decision.

Sources: Bailey, Koyani and Nall, 2000; Coney and Steehouder, 2000; Evans, 1998; Farkas and Farkas, 2000; IEEE; Larson and Czerwinski, 1998; Miller and Remington, 2000; Mobrand and Spyridakis, 2002; Nielsen and Tahir, 2002; Spool, et al., 1997; Spyridakis, 2000.

Example:

'COOL' refers to an application that allows users to search for all jobs within the Department of Commerce (not just the Census Bureau.) This link does a poor job in explaining itself.

Professional:
Student, Entry, & Mid-Career

Opportunities for All U.S. Nationwide

COOL:

Learn About Cancer
Learn about different types of cancer, risk factors, prevention, treatment, and more. You can also read stories of hope from people whose lives have been touched by cancer and get the latest news.

Stories of Hope
Discover what others have faced, how they have fought, and what they have learned about life and love in their experiences with cancer.

Talking About Cancer
Learn how to talk about your experience to people who are close to you and those outside your inner circle.

Treatment Decision Tools
Get a detailed profile of a specific type of cancer to make informed choices about treatment.

Getting Specific
Get information and resources for a specific type of cancer wherever you see this heading.

All About Cancer
Get answers to all your questions about cancer.

Other Information Sources
Browse other Web sites on cancer, books on cancer, and related information on our site.

Relative Importance:
12340

Strength of Evidence:
12340

See page xxi
for detailed descriptions
of the rating scales

12340

10:5 Match Link Names with Their Destination Pages

Guideline: Make the link text consistent with the title or headings on the destination (i.e., target) page.

Comments: Closely matched links and destination targets help provide the necessary feedback to users that they have reached the intended page.

If users will have to click more than once to get to a specific target destination, avoid repeating the exact same link wording over and over because users can be confused if the links at each level are identical or even very similar. In one study, after users clicked on a link entitled "First Aid," the next page had three options. One of them was again titled "First Aid." The two "First Aid" links went to different places. Users tended to click on another option on the second page because they thought that they had already reached "First Aid."

Sources: Bailey, Koyani and Nall, 2000; Levine, 1996; Mobrand and Spyridakis, 2002.

Example:

U.S. Environmental Protection Agency

Browse EPA Topics
Recent Additions | Contact Us | Print Version Search: GO Advanced Search
EPA Home > Browse EPA Topics

The following list organizes EPA topics into broad categories. A [much longer list](#) presents EPA topics alphabetically.

Alphabetical List of all Topics

Air
Acid Rain, Global Warming, Emissions...

Cleanup
Brownfields, Superfund, Corrective Action...

Compliance & Enforcement
Compliance, Compliance Assistance...

Economics

Industry
Small Business, Permits, Reporting...

International Cooperation
Border Issues, Technical Assistance...

Pesticides
Insecticides, Registration, Food Safety...

Pollutants/Toxics
Lead, Dioxins, Chemicals, Radiation...

Recursos en Español
Contact Us | Print Version Search: GO
EPA Home > Recursos en Español

Bienvenidos a Recursos en Español. Aquí encontrarán documentos y sitios de la EPA sobre varios temas. Hay cinco secciones: Vida Diaria, Vida Profesional, Protegiendo a los Niños, Emergencias en el Medio Ambiente, y Otros Recursos en Español. Abajo hay una descripción de cada sección.

Vida Diaria
Familiarícese con las situaciones del medio ambiente y con los riesgos al medio ambiente y a la salud humana causados por la contaminación. Los documentos incluidos aquí tratan sobre situaciones que enfrentamos en nuestro día a día.

Protegiendo a los Niños
Aumentando el conocimiento sobre posibles amenazas ambientales a los niños. Encuentre información sobre la nueva [Oleada de Protección de la Salud Infantil](#).

Otros Recursos en Español
Enlaces hacia otros sitios en la Red del Internet en español donde se encuentra información de interés relativa al medio ambiente.

Vida Profesional
Lea los documentos técnicos, los reportajes, las leyes y normativas, las bases de datos científicos y programas de computador, y otras fuentes de información para usuarios más experimentados.

Emergencias en el Medio Ambiente
A quién notificar y cómo estar preparado en caso de una emergencia ambiental.

Leyes y Tratados en Español
Enlaces hacia otros sitios en la Red del Internet en español donde se encuentra información sobre los tratados internacionales relativos al medio ambiente.

[EPA Página Principal | Explore Otros Temas | Lo Nuevo | Comentarios | Buscar]
Información sobre el sitio central de la EPA sobre Internet

Link text in the left navigation panel is identical to the headings found on the destination page.

10:6 Ensure that Embedded Links are Descriptive

Guideline: When using embedded links, the link text should accurately describe the link's destination.

Comments: Users tend to ignore the text that surrounds each embedded link; therefore do not create embedded links that use the surrounding text to add clues about the link's destination.

Sources: Bailey, Koyani and Nall, 2000; Bernard and Hull, 2002; Card, et al., 2001; Chi, Pirolli and Pitkow, 2000; Evans, 1998; Farkas and Farkas, 2000; Mobrand and Spyridakis, 2002; Sawyer and Schroeder, 2000; Spool, et al., 1997.

Example: These embedded links are well designed—because the entire organization name is a link, the user does not have to read the surrounding text to understand the destination of the embedded link.

the Intelligence Community and exercises the powers of the Director when the Director's position is vacant or in the Director's absence or disability.

The Associate Director of Central Intelligence for Homeland Security, Office of the Director of Central Intelligence, ensures the flow of intelligence in support of homeland defense. The current director is [Winston P. Wiley](#).

The Executive Director of the Central Intelligence Agency membership five mission centers with duties that are Officer, Security, Human Resources and Global Support.

The [Directorate of Intelligence](#), the analytical branch of intelligence analysis on key foreign issues. The current director is [Jami A. Misck](#).

The [Directorate of Science and Technology](#) creates mission. The current director is [Donald M. Kerr](#).

The Directorate of Operations is responsible for the Pavitt.

The [Center for the Study of Intelligence](#) maintains the Agency's historical materials and promotes the study of intelligence as a

Relative Importance:
12340

Strength of Evidence:
12340

The [Directorate of Intelligence](#), the analytical branch of intelligence analysis on key foreign issues. The current director is [Jami A. Misck](#).

The [Directorate of Science and Technology](#) creates mission. The current director is [Donald M. Kerr](#).

In this example, the user must read the surrounding text to gain clues as to the link's destination. In many cases, users will not read that text.

the economy, efficiency, and effectiveness of the federal government through financial audits, program reviews and evaluations, analyses, legal opinions, investigations, and other services. GAO's activities are designed to ensure the executive branch's accountability to the Congress under the Constitution and the government's accountability to the American people. GAO is dedicated to good government through its commitment to the core values of [accountability](#), [integrity](#), and [reliability](#).

[From the Comptroller General](#)
[David M. Walker](#), Comptroller General of the United States
[Selected Speeches, Writings, and Press Statements](#)
[Press Statement, February 7, 2003](#) **New**

[GAO's Performance and Accountability Report 2002](#), [Highlights](#), and [related materials](#) including the Strategic Plan 2002-2007

[GAO Reports](#)
Updated daily. "Today's Reports," [Highlights](#), Special Collections including [Desert Shield and Desert Storm Reports](#)

[Investigations, and other services. GAO's activities are designed to ensure the executive branch's accountability to the Congress under the Constitution and the government's accountability to the American people. GAO is dedicated to good government through its commitment to the core values of accountability, integrity, and reliability.](#)

[GAO Policy and Procedures Manual for Guidance to Federal Agencies](#)

Relative Importance:
12340

Strength of Evidence:
12340

See page xxi for detailed descriptions of the rating scales
12340

10:7 Repeat Important Links

Guideline: Ensure that important content can be accessed from more than one link.

Comments: Establishing more than one way to access the exact same information can help some users find what they need. When certain information is critical to the success of the website, provide more than one link to the information. Different users may try different ways to find information depending on their own interpretations of a problem and the layout of a page. Some users find important links easily when they have a certain label, while others may recognize the link best with an alternative name.

Sources: Bernard, Hull and Drake, 2001; Detweiler and Omanson, 1996; Ivory, Sinha and Hearst, 2000; Ivory, Sinha and Hearst, 2001; Levine, 1996; Nall, Koyani and Lafond, 2001; Nielsen and Tahir, 2002; Spain, 1999; Spool, Klee and Schroeder, 2000.

Example: Multiple links provide users with alternative routes for finding the same information.

If the user misses the "Hours" link in the left panel, they still have a chance to find the header in the content panel.

Visitor Information
Welcome to America's museum

Everything under the Sun

Visitor Information

- Hours
- Maps
- Directions
- Tours
- Museum Stores
- Dining
- Tips for Visiting
- Security and Policies

Visitor Information for:

- Kids & Families
- Groups
- Visitors with Disabilities
- Foreign Language Speakers

Welcome to the Smithsonian Institution, the world's largest museum complex research organization. Composed of sixteen museums and galleries, as well as the National Zoo, the Smithsonian's exhibitions offer visitors a glimpse into its vast collection numbering over 142 million objects.

Visit the Smithsonian and you will see why it represents for so many the treasured icons of our past,

Relative Importance:
12340

Strength of Evidence:
12340

Types of Cancer

[What You Need To Know About™ Cancer Index](#)
Information about detection, symptoms, diagnosis, and treatment of many types of cancer.

*** Common Cancers**

- [Bladder Cancer](#)
- [Breast Cancer](#)
- [Colon Cancer](#)
- [Endometrial Cancer](#)
- [Head and Neck Cancer](#)
- [Leukemia](#)
- [Lung Cancer](#)
- [Melanoma](#)
- [Non-Hodgkins Lymphoma](#)
- [Ovarian Cancer](#)
- [Prostate Cancer](#)
- [Rectal Cancer](#)

*** Childhood/Pediatric Cancers**

- [Childhood Cancers Home Page](#)

*** Cancers by Body Location/System**

- [AIDS-Related](#)
- [Bone](#)
- [Brain](#)
- [Breast](#)
- [Digestive/Gastrointestinal](#)
- [Endocrine](#)
- [Eye](#)
- [Genitourinary](#)
- [Germ Cell](#)
- [Gynecologic](#)
- [Head and Neck](#)
- [Hematologic/Blood](#)
- [Leukemia](#)
- [Lung](#)
- [Lymphoma](#)
- [Musculoskeletal](#)
- [Neurologic](#)
- [Pregnancy and Cancer](#)
- [Respiratory/Thoracic](#)
- [Skin](#)
- [Unknown Primary](#)

Alphabetical List of Cancers

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Hours
(Members and children under age 12 are admitted free. Free public admission is offered on Tuesdays, 5-9pm).

Most museums are open daily, 10am-5:30pm, except December 25.

10:8 Designate Used Links

Guideline: Use color changes to indicate to users when a link has been visited.

Comments: Generally, it is best to use the default text link colors (blue as an unvisited location/link and purple as a visited location/link). Link colors help users understand which parts of a website they have visited. In one study, providing this type of feedback was the only variable found to improve the user's speed of finding information. If a user selects one link, and there are other links to the same target, make sure all links to that target change color.

Sources: Evans, 1998; Nielsen and Tahir, 2002; Nielsen, 1996a; Nielsen, 1999b; Nielsen, 1999c; Spool, et al., 1997; Tullis, 2001.

Example:

Opportunities

- [Access America for Seniors](#)
- [Government Benefits](#)
- [Nonprofit Gateway](#)
- [Procurement](#)
- [Small Business Opportunities](#)
- [Technology Transfer](#)
- [USDA /1890 National Scholars Program](#)
- [USDA Debarment and Suspension](#)
- [Contacts](#)
- [U.S. State and Local Gateway](#)

Employment:

- [USDA](#)
- [Intern Programs](#)
- [All Federal Government](#)
- [USDA Telework Center](#)
- [Senior Executive Service Candidate Development Program](#)

A poor design choice. Unvisited links are in green, whereas visited links are in blue—users expect blue to denote an unvisited link.

Schools / IMSOs -- Air Force

[Advanced Airlift Tactics Training Center](#), St Joseph

[Air Command & Staff College](#), Maxwell AFB AL

[Air Education and Training Command](#), Randolph

[Air Force Institute of Technology](#), Wright-Patterson

[Air University](#), Maxwell AFB AL

[Air War College](#), Maxwell AFB AL

[Altus AFB OK](#)

[College for Enlisted Professional Military Education](#)

[Columbus AFB MS](#)

[Fairchild AFB WA](#)

[Goodfellow AFB TX](#)

[Inter-American Air Forces Academy](#), Lackland AFB

[Joint Special Operations University](#), Hurlburt Field

[Keesler AFB MS](#)

[Lackland AFB TX](#)

[Little Rock AFB AR](#)

[Luke AFB AZ](#)

[Randolph AFB TX](#)

[School of Aerospace Medicine](#), Brooks AFB TX

[Sheppard AFB TX](#), [IMSO](#)

[Squadron Officer School](#), Maxwell AFB AL

[Tyndall AFB FL](#)

[Vance AFB OK](#)

[Wright-Patterson AFB OH](#)

A good design choice—unvisited links are shown in blue, and visited links are shown in purple. Note the conventional use of colors for visited and unvisited links.

Relative Importance:
12340

Strength of Evidence:
12000

See page xxi
for detailed descriptions
of the rating scales

12340

10:9 Link to Related Content

Guideline: Provide links to other pages in the website with related content.

Comments: Users expect designers to know their websites well enough to provide a full list of options to related content.

Sources: Koyani and Nall, 1999.

Example:

Related Links

Latest Business News

[War Spurs Fears of Another Recession](#) (The Washington Post, 3/28/03)

[U.N. Nears Approval of Using Oil to Buy Iraq Aid](#) (The Washington Post, 3/28/03)

[Lawmakers Tell TSA to Reduce Excess of Screeners](#) (The Washington Post, 3/28/03)

Business Section

Technology Section

Special Report

Military

Columnist

Washington Post reporter Steve Vogel covers local runs every other week.

Full Coverage

[More National Security News](#)

[Full Mideast Coverage](#)

Additional Information

[U.S. Department of Commerce Website](#)

[Office of The Chief Financial Officer](#)

[Other Acquisition Related Sites](#)


[FedBiz Opps](#)

[FirstGov](#)

[Where in Federal Contracting?](#)

Graphic

Sniper Shootings:
Interactive map shows details of victims and ballistics. (Flash 6)




Recent Stories

- [Sniper Case Judge Assails Leaks](#) (The Washington Post, Apr 19, 2003)
- [Moose's Dispute On Book Escalates](#) (The Washington Post, Apr 18, 2003)
- [Sniper Suspect Faces More Disciplinary Action](#) (Associated Press, Apr 17, 2003)
- [Malvo Faces Jail Discipline](#) (The Washington Post, Apr 17, 2003)
- [Moose Asks For Review Of Book Ban](#) (The Washington Post, Apr 15, 2003)
- [More Shootings Coverage](#)

Photo Gallery

Sniper Shootings: The region's schools felt like fortresses as helicopters flew overhead and jittery parents walked their children to class.



Relative Importance:
12340

Strength of Evidence:
12000

10:10 Link to Supportive Information

Guideline: Provide links to supportive information.

Comments: Use links to provide definitions and descriptions to clarify technical concepts or jargon, so that less knowledgeable users can successfully use the website. For example, provide links to a dictionary, glossary definitions, and sections dedicated to providing more information.

Sources: Farkas and Farkas, 2000; Levine, 1996; Morrell, et al., 2002; Zimmerman and Prickett, 2000.

Example:

Relative Importance:

12300

Strength of Evidence:

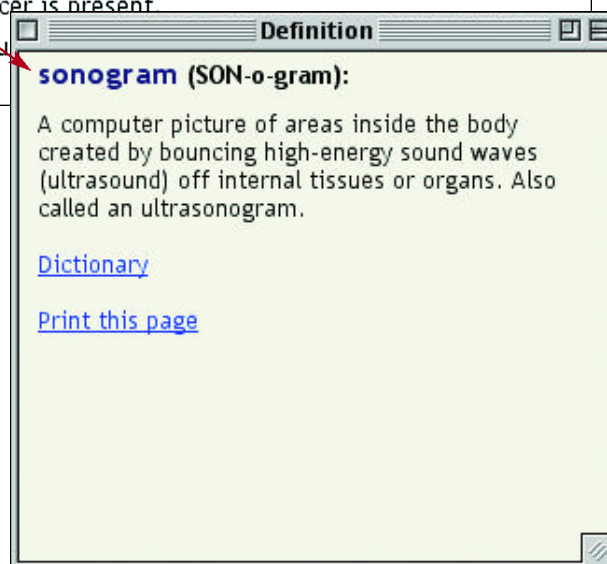
12000

Tests that examine the breasts are used to detect (find) and diagnose breast cancer.

If an abnormality is found, one or all of the following tests may be used:

- **Ultrasound:** A test that uses sound waves to create images of areas inside the body. sound waves are bounced off internal **tissues** and organs. The echoes are changed into called **sonograms**. The doctor can identify **tumors** by looking at the sonogram.
- **Mammogram:** A special **x-ray** of the breast that may find tumors that are too small to mammogram can be performed with little risk to the **fetus**. Mammograms in pregnant appear negative even though cancer is present.
- **Biopsy:** The removal of **cells**, tissue, disease.

Clicking on a highlighted word brings up a 'pop-up' box which provides the user with the definition of the selected word.



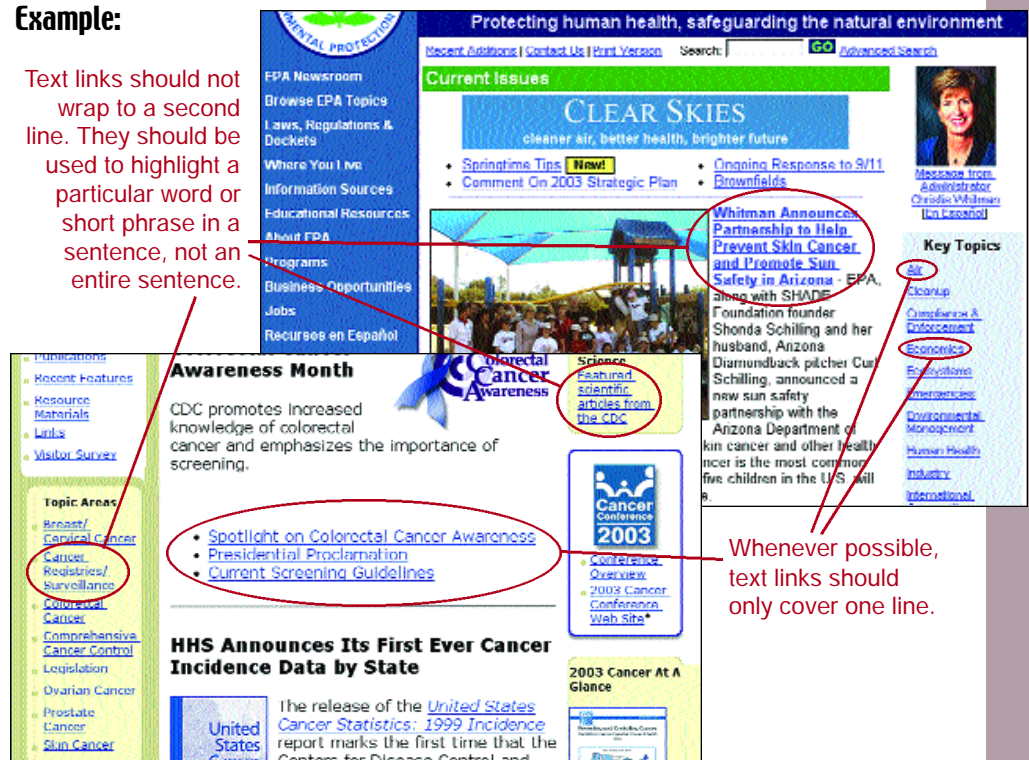
10:11 Use Appropriate Text Link Lengths

Guideline: Make text links long enough to be understood, but short enough to minimize wrapping.

Comments: A single word text link may not give enough information about the link's destination. A link that is several words may be difficult to read quickly, particularly if it wraps to another line. Generally, it is best if text links do not extend more than one line. However, one study found that when users scan prose text, links of nine to ten words elicit better performance than shorter or longer links. Keep in mind that it is not always possible to control how links will look to all users because browser settings and screen resolutions can vary.

Sources: Card, et al., 2001; Chi, Piroli and Pitkow, 2000; Evans, 1998; Levine, 1996; Nielsen and Tahir, 2002; Nielsen, 2000; Sawyer and Schroeder, 2000; Spool, et al., 1997.

Example:



10:12 Indicate Internal vs. External Links

Guideline: Indicate to users when a link will move them to a different location on the same page or to a new page on a different website.

Comments: One study showed that users tend to assume that links will take them to another page within the same website. When this assumption is not true, users can become confused. Designers should try to notify users when they are simply moving down a page, or leaving the site altogether.

Sources: Nall, Koyani and Lafond, 2001; Nielsen and Tahir, 2002; Spool, et al., 1997.

Example:

Add URL addresses below links to help users determine where they are going. By seeing .gov and .com the user is also alerted to the type of site they will visit.

[Research-Based Web Design & Usability Guidelines](http://usability.gov/guidelines)
<http://usability.gov/guidelines>

- Provides guidelines for improving Web design, navigation, functionality
- Includes findings from Web design and usability literature identified by the National Cancer Institute and provides references

[Web Design Guidelines: Design in Action](http://www-3.ibm.com/ibm/easy/eou_ext.nsf/Publish/572)
http://www-3.ibm.com/ibm/easy/eou_ext.nsf/Publish/572

- Provides guidelines on Web site planning, design, production, and maintenance
- Offers guidelines on e-commerce

[Web Publishing Guide](http://www.ieee.org/web/developers/style/)
<http://www.ieee.org/web/developers/style/>

Relative Importance:

12300

Strength of Evidence:

12000

gn, including planning, chance

"Exit disclaimer" graphic informs user that the link will take them to a new website.

You are exiting the White House Web Server

Thank you for visiting our site.

You will now access <http://www.achp.gov/>

We hope your visit was informative and enjoyable.

To comment on this service, send feedback to the [Web Development Team](#)

Clicking an outside link leads to this "interim" page that warns users of their imminent transfer to a non-whitehouse.gov website.

10:13 Use 'Pointing-and-Clicking'

Guideline: 'Pointing-and-clicking,' rather than 'mousing-over,' is preferred when selecting menu items from a cascading menu structure.

Comments: One study found that when compared with the 'mouseover' method, the 'point-and-click' method takes eighteen percent less time, elicits fewer errors, and is preferred by users.

Sources: Chaparro, Minnaert and Phipps, 2000.

Example:



This site relies on users to 'mouse-over' the main links (shown on the bottom of the page) to reveal the sub-menu links (shown extending to the right in gray). The use of this 'mouseover' method is slower than 'pointing-and-clicking.'

10:14 Clarify Clickable Regions of Images

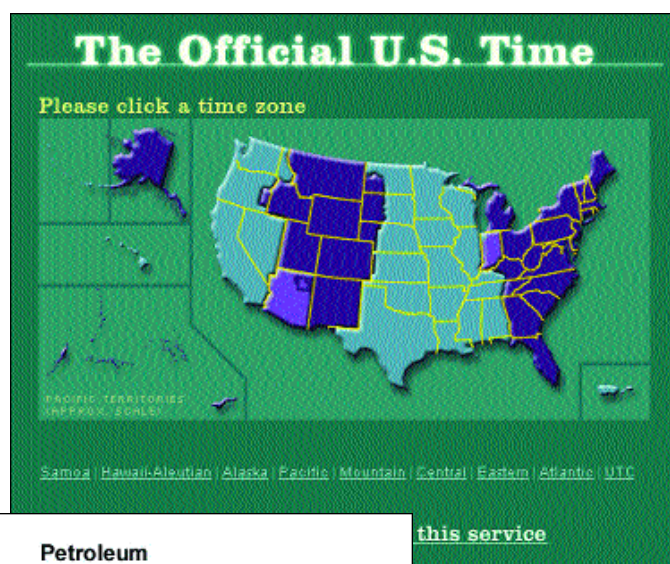
Guideline: If any part of an image is clickable, ensure that the entire image is clickable or that the clickable sections are obvious.

Comments: Users should not be required to use the mouse pointer to discover clickable areas of images. For example, in a map of the United States, if individual states are clickable, sufficient cues should be given to indicate the clickable states.

Sources: Detweiler and Omanson, 1996; Levine, 1996; Lim and Wogalter, 2000.

Example:

Dramatically different colors delineate clickable regions.



Relative Importance:

12300

Strength of Evidence:

12300

Text Appearance

There are several issues related to text

characteristics that can help ensure a website communicates effectively with users:

- Use familiar fonts that are at least 12-points;
- Use black text on plain, high-contrast backgrounds; and
- Use background colors to help users understand the grouping of related information.

Even though it is important to ensure visual consistency, steps should be taken to emphasize important text. Commonly used headings should be formatted consistently, and attention-attracting features, such as animation, should only be used when appropriate.



The use of white space between clickable regions in this image map define the boundaries of each individual "hot" area.

See page xxi
for detailed descriptions
of the rating scales

12340

11:1 Use Black Text on Plain, High-Contrast Backgrounds

Guideline: When users are expected to rapidly read and understand prose text, use black text on a plain, high-contrast, non-patterned background.

Comments: Black text on a plain background elicited reliably faster reading performance than on a medium-textured background. When compared to reading light text on a dark background, people read black text on a white background up to thirty-two percent faster. In general, the greater the contrast between the text and background, the easier the text is to read.

Sources: Boyntoin and Bush, 1956; Bruce and Green, 1990; Cole and Jenkins, 1984; Evans, 1998; Goldsmith, 1987; Gould, et al., 1987a; Gould, et al., 1987b; Jenkins and Cole, 1982; Kosslyn, 1994; Muter and Maurutto, 1991; Muter, 1996; Scharff, Ahumada and Hill, 1999; Snyder, et al., 1990; Spencer, Reynolds and Coe, 1977a; Spencer, Reynolds and Coe, 1977b; Treisman, 1990; Williams, 2000.

Example:

Relative Importance:

12345

Strength of Evidence:

12345

Web Review on familyd SARS: Keep Current and Informed
By Howard and Judi Wallnary

In recent weeks, we've all seen the news stories and in the streets of China. We've heard reports and within the month, President Bush issued an executive order. SARS is a global threat and we need to be informed.

Unsurprisingly, SARS has led to the top of the "Yellow" Season priority list. We are providing this information to help you stay informed.

What does it all mean? Here are some basic facts: SARS, which is short for severe acute respiratory syndrome, is a natural infection to eat less food, pneumonia. It is a coronavirus that causes mild to moderate upper-respiratory illness. It will burn off some of its fat. But that is common cold. Worldwide about 3,000 people have been infected by SARS, and just over 100 people have died. In fact, there have been only 500 suspected SARS cases, and no deaths.

So, there's no need to panic. Instead, get informed. The Internet is here to help, with reliable sources and info, and all that time there were diets. To get the most out of the Internet, there are some tips to help you stay informed. We've developed this online mechanism to help us stay in the face of low food intake.

When researchers compare overweight and thin people, they find that they eat roughly the same number of calories. The difference is the amount of fat that they eat. Thin people tend to eat less fat and more carbohydrates. Losing weight is not something one can do overnight. A carefully planned weight loss program requires guidelines. Unfortunately, there's a lot of misinformation floating around and lots of desperate people are

Links to Related Articles

- [Usability Engineering for the Web](http://www.w3j.com/5/s3.instone.html), Keith Instone, World Wide Web Journal
- [Usability Glossary](http://www.usabilityfirst.com/glossary/glossary.taf), Usability First

▲ Top of Page

See page xxi for detailed descriptions of the rating scales

12345

11:2 Ensure Visual Consistency

Guideline: Ensure visual consistency of website elements within and between Web pages.

Comments: Two studies found that the number of errors made using visually inconsistent displays is reliably higher than when using visually consistent displays. Visual consistency includes the size and spacing of characters; the colors used for labels, fonts and backgrounds; and the locations of labels, text and pictures. Earlier studies found that tasks performed on more consistent interfaces resulted in (1) a reduction in task completion times; (2) a reduction in errors; (3) an increase in user satisfaction; and (4) a reduction in learning time.

However, users tend to rapidly overcome some types of inconsistencies. For example, one study found that the use of different-sized widgets (such as pushbuttons, entry fields, or list boxes) does not negatively impact users' performance or preferences.

Sources: Adamson and Wallace, 1997; Adkisson, 2002; Badre, 2002; Card, Moran and Newell, 1983; Cockburn and Jones, 1996; Eberts and Schneider, 1985; Grudin, 1989; Nielsen, 1999d; Osborn and Elliott, 2002; Ozok and Salvendy, 2000; Parush, Nadir and Shtub, 1998; Schneider and Shiffrin, 1977; Schneider, Dumais and Shiffrin, 1984; Tullis, 2001.

Example: An example of good visual consistency. Location and size of pictures, title bar, and font all contribute to visual consistency.

Home | Site Map | A-Z Index | Ask an Energy Expert

Buildings

Buildings Topics

Buildings News

250 Kilowatt Fuel Cell

Hydrogen

Hydrogen Topics

Hydrogen News

250 Kilowatt Fuel Cell

Wind

Wind Energy Topics

Wind News

United States Helps Fund Study for Hungarian Wind Power Project March 19, 2003

Renewable Power Plants Win Contracts in California and Nevada March 19, 2003

Building Developer and Town Buy Large

11:3 Format Common Items Consistently

Guideline: Ensure that the format of common items is consistent from one page to another.

Comments: The formatting convention chosen should be familiar to users. For example, telephone numbers should be consistently punctuated (800-555-1212), and time records might be consistently punctuated with colons (HH:MM:SS).

Sources: Ahlstrom and Longo, 2001; Engel and Granda, 1975; Mayhew, 1992; Smith and Mosier, 1986; Tufte, 1983.

Relative Importance:
12340

Strength of Evidence:
12000

11:4 Use at Least 12-Point Font

Guideline: Use at least a 12-point font (e.g., typeface) on all Web pages.

Comments: Research has shown that fonts smaller than 12-points elicit slower reading performance from users. For users over age 65, it may be better to use at least 14-point fonts. Never use less than 6-point font on a website.

Traditional paper-based font sizes do not translate well to website design. For instance, Windows Web browsers display type 2 to 3 points larger than the same font displayed on a Macintosh. User-defined browser settings may enlarge or shrink designer-defined font sizes. Defining text size using pixels will result in differently-sized characters depending upon the physical size of the monitor's pixels and its set resolution, and presents accessibility issues to those individuals that must specify large font settings.

Sources: Bailey, 2001; Bernard and Mills, 2000; Bernard, Liao and Mills, 2001a; Bernard, Liao and Mills, 2001b; Bernard, et al., 2002; Ellis and Kurniawan, 2000; Galitz, 2002; Tinker, 1963; Tullis, 2001; Tullis, Boynton and Hersh, 1995.

Relative Importance:
12340

Strength of Evidence:
12345

See page xxi
for detailed descriptions
of the rating scales
12340

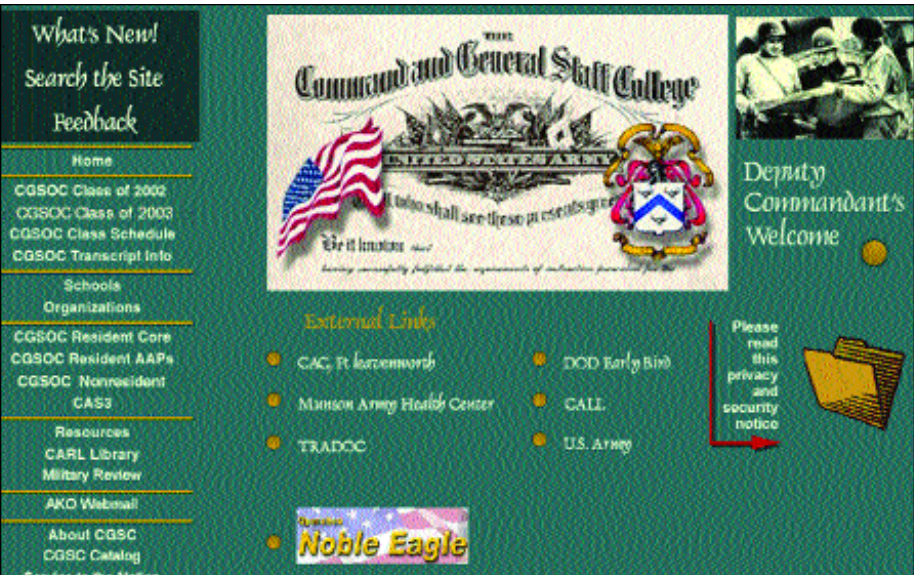
11:5 Use Familiar Fonts

Guideline: Use a familiar font to achieve the best possible reading speed.

Comments: Research shows no reliable differences in reading speed or user preferences for 12-point Times New Roman or Georgia (serif fonts), or Arial, Helvetica or Verdana (sans serif fonts).

Sources: Bernard and Mills, 2000; Bernard, Liao and Mills, 2001a; Bernard, et al., 2002; Bernard, et al., 2001; Boyarski, et al., 1998; Evans, 1998; Tullis, Boynton and Hersh, 1995; Williams, 2000.

Example: Using unfamiliar fonts may slow reading speeds.



or Info New TV Scripts Film Scripts Film Transcripts Halku Writers Anime Links Cut Views Sub
Contest Trade Search Contact

11:6 Emphasize Importance

Guideline: Change the font characteristics to emphasize the importance of a word or short phrase.

Comments: Font characteristics that are different from the surrounding text will dominate those that are routine. Important font characteristics include bolding, italics, font style (serif vs. sans serif), font size (larger is better to gain attention), and case (upper vs. lower). When used well, text style can draw attention to important words.

The use of differing font characteristics has negative consequences as well—reading speed can decrease by almost twenty percent, and thus should be used sparingly in large blocks of prose. Do not use differing font characteristics to show emphasis for more than one or two words or a short phrase. Do not use underlining for emphasis because underlined words on the Web are generally considered to be links.

Sources: Bouma, 1980; Breland and Breland, 1944; DeRouvray and Couper, 2002; Evans, 1998; Faraday, 2000; Foster and Coles, 1977; Lichty, 1989; Marcus, 1992; Paterson and Tinker, 1940a; Poulton and Brown, 1968; Rehe, 1979; Spool, et al., 1997; Tinker and Paterson, 1928; Tinker, 1955; Tinker, 1963; Vartabedian, 1971; Williams, 2000.

Example: Limited use of bolding effectively emphasizes important topic categories.

DoD Sites

DoD on the World Wide Web  [Comment](#)

• Air Force	• Guard and Reserve
• Army	• Homeland Security
• Budget	• Iraq
• Business Opportunities	• Joint Chiefs of Staff
• Civilian Job Opportunities	• Korea
• Coast Guard	• Marine Corps
• Combined Federal Campaign	• Navy
• Dear Abby, Operation	• Organization of DoD
• Defend America	• Pay
• DeploymentLINK	• Pentagon
• Enduring Freedom	• Recruiting
• Environment	• Secretary of Defense
• Facts and Statistics	• Terrorism and Terrorists
• Family	• Ticare (Military Health System)
• Force Transformation (03/27/2003)	• Unified Combatant Commands

Relative Importance:
12300
Strength of Evidence:
12345

11:7 Use Attention-Attracting Features when Appropriate

Guideline: Draw attention to specific parts of a Web page with the appropriate (but limited) use of moving or animated objects, size differential between items, images, brightly-colored items, and varying font characteristics.

Comments: Use attention-attracting features with caution and only when they are highly relevant.

Not all features of a website will attract a user's attention equally. The following features are presented in order of the impact they have on users:

- Movement (e.g., animation or 'reveals') is the most effective attention-getting item. Research suggests that people cannot stop themselves from initially looking at moving items on a page. However, if the movement is not relevant or useful, it may annoy the user. If movement continues after attracting attention, it may distract from the information on the website.
- Larger objects, particularly images, will draw users' attention before smaller ones. Users fixate on larger items first, and for longer periods of time. However, users will tend to skip certain kinds of images that they believe to be ads or decoration.
- Users look at images for one or two seconds, and then look at the associated text caption. In many situations, reading a text caption to understand the meaning of an image is a last resort. Parts of images or text that have brighter colors seem to gain focus first.

Having some text and graphic items in brighter colors, and others in darker colors, helps users determine the relative importance of elements. Important attention-attracting font characteristics can include all uppercase, bolding, italics, underlining and increased font size.

Sources: Campbell and Maglio, 1999; Evans, 1998; Faraday and Sutcliffe, 1997; Faraday, 2000; Faraday, 2001; Galitz, 2002; Hillstrom and Yantis, 1994; Lewis and Walker, 1989; McConkie and Zola, 1982; Nygren and Allard, 1996; Treisman, 1988; Williams, 2000.

Example:

Relative Importance:
12000
Strength of Evidence:
12345



Lists are commonly found on websites. These

may be lists of, for example, people, drugs, theaters, or restaurants.

Each list should be clearly introduced and have a descriptive title. A list should be formatted so that it can be easily scanned. The order of items in the list should be done to maximize user performance, which usually means that the most important items are placed toward the top of the list. If a numbered list is used, start the numbering at "one," not "zero." Generally only the first letter of the first word is capitalized, unless a word that is usually capitalized is shown in the list.

Guideline: Arrange lists and tasks in an order that best facilitates efficient and successful user performance.

Relative Importance:

12340

Strength of Evidence:

12345

Comments: Designers should determine if there is an order for items that will facilitate use of the website. If there is, ensure that the site is formatted to support that order, and that all pages follow the same order. For example, ensure that lists of items, sets of links, and a series of tabs are in a meaningful order.

Where no obvious order applies, organize lists alphabetically or numerically. Keep in mind that it is the user's logic that should prevail rather than the designer's logic.

Sources: Bransford and Johnson, 1972; Detweiler and Omanson, 1996; Engel and Granda, 1975; Evans, 1998; Flower, Hayes and Swarts, 1983; Halgren and Cooke, 1993; Morkes and Nielsen, 1998; Nygren and Allard, 1996; Ozok and Salvendy, 2000; Redish, Felker and Rose, 1981; Smith and Mosier, 1986; Spyridakis, 2000.

Example: Ordering list by region and then alphabetically by country allows users to rapidly find desired information.

Region/Country
North America
Canada
Mexico
United States
Other
Total
Central & South America
Argentina
Bolivia
Brazil
Chile
Colombia
Costa Rica
Cuba
Dominican Republic
Ecuador
El Salvador
Guatemala
Honduras

Ordering list by region and then alphabetically by country allows users to rapidly find desired information.

If most of your users will be looking for the same item, then place it at the top of your list.

This list should be ordered to read down columns, not across rows.

Alabama	Alaska	Arizona	Arkansas
California	Colorado	Connecticut	Delaware
District of Columbia	Florida	Georgia	Hawaii
Idaho	Illinois	Indiana	Iowa
Kansas	Kentucky	Louisiana	Maine
Maryland	Massachusetts	Michigan	Minnesota
Mississippi	Missouri	Montana	Nebraska
Nevada	New Hampshire	New Jersey	New Mexico
New York	North Carolina	North Dakota	Ohio

12:2 Display Related Items in Lists

Guideline: Display a series of related items in a vertical list rather than as continuous text.

Comments: A well-organized list format tends to facilitate rapid and accurate scanning. One study indicated that users scan vertical lists more rapidly than horizontal lists. Scanning a horizontal list takes users twenty percent longer than scanning a vertical list.

Sources: Mayhew, 1992; Nygren and Allard, 1996; Smith and Mosier, 1986; Tullis, 1984; Wright, 1977.

Example:

The Office of Data makes available for download

- [Annual Production Statistics](#)
- [Monthly Production Statistics](#)
- [Weekly Production Statistics](#) and
- [Quarterly Consumption Projections](#).

Bulleted lists are easier to scan and understand.

The Office of Data makes available for download [Annual Production Statistics](#), [Monthly Production Statistics](#), [Weekly Production Statistics](#), and [Quarterly Consumption Projections](#).

Horizontal lists are more difficult to scan and understand.

Relative Importance:

12340

Strength of Evidence:

12340

12:3 Introduce Each List

Guideline: Provide an introductory heading (i.e., word or phrase) at the top of each list.

Comments: Providing a descriptive heading allows users to readily understand the reason for having a list of items, and how the items relate to each other. The heading helps to inform users how items are categorized, or any prevailing principle or theme. Users are able to use lists better when they include headings.

Sources: Bransford and Johnson, 1972; Bransford and Johnson, 1973; Detweiler and Omanson, 1996; Engel and Granda, 1975; Levine, 1996; Redish, 1993; Smith and Goodman, 1984; Smith and Mosier, 1986.

Example:



Relative Importance:

12340

Strength of Evidence:

12340



12:4 Format Lists to Ease Scanning

Guideline: Make lists easy to scan and understand.

Comments: The use of meaningful labels, effective background colors, borders, and white spaces allow users to identify a set of items as a discrete list.

Sources: Chaparro and Bernard, 2001; Detweiler and Omanson, 1996; Levine, 1996; Nielsen and Tahir, 2002; Nygren and Allard, 1996; Spyridakis, 2000; Treisman, 1982.

Example:

These websites use background colors and thin white lines between information groups to make these lists easy to scan.



Relative Importance:

12340

Strength of Evidence:

12340

12:5 Start Numbered Items at One

Guideline: When items are numbered, start the numbering sequence at "one" rather than "zero."

Comments: Do not start the numbering with a "zero." When counting, people start with "one," not "zero."

Sources: Engel and Granda, 1975; Smith and Mosier, 1986.

Relative Importance:

12340

Strength of Evidence:

12000

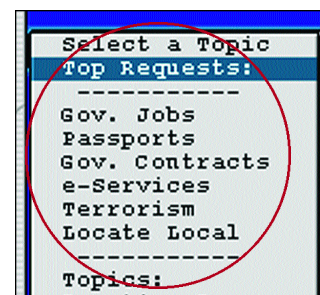
12:6 Place Important Items at Top of the List

Guideline: Place a list's most important items at the top.

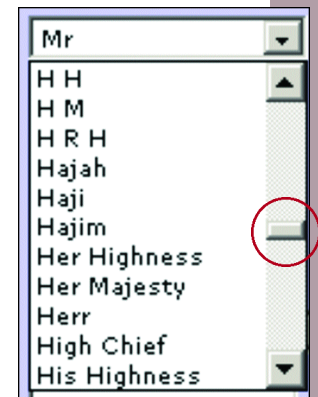
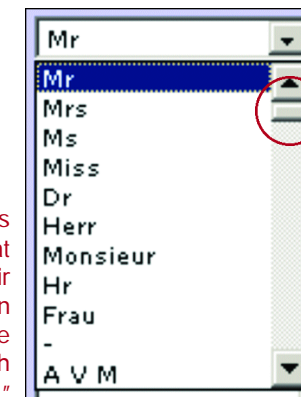
Comments: Experienced users usually look first at the top item in a menu or list, and almost always look at one of the top three items before looking at those farther down the list. Research indicates that users tend to stop scanning a list as soon as they see something relevant, thus illustrating the reason to place important items at the beginning of lists.

Sources: Byrne, Anderson, et al., 1999; Carroll, 1990; Evans, 1998; Faraday, 2001; Isakson and Spyridakis, 1999; Lewenstein, et al., 2000; Nielsen, 1996a; Nielsen, 1999b; Nielsen, 1999c; Spyridakis, 2000.

Example: On firstgov.gov, the "Topics" drop-down list presents the "Top Requests" in the first positions of the list, and then continues alphabetically by topic. This tactic can save users time when searching for popular items or topics.



This extensive list of titles contains the most commonly used titles at the top of the list and also in their alphabetically-correct position further down the list. This avoids the need for users to scroll through titles such as "His Highness."



12:7 Capitalize First Letter of First Word in Lists

Guideline: Capitalize the first letter of only the first word of a list item, a list box item, check box labels, and radio button labels.

Comments: Only the first letter of the first word should be capitalized unless the item contains another word that normally would be capitalized.

Sources: Bailey, 1996; Fowler, 1998; Marcus, Smilonich and Thompson, 1995; Microsoft, 1992.

Example:

Services

- Email services
- Headline service
- Text alerts and PDA

Events & offers

- Write topical haiku win Penguin Classics

Information

- Contact us
- Newsroom
- Style guide
- Advertising guide
- Privacy policy
- Terms and conditions
- The Guardian
- Guardian readers' editor
- The Observer
- Observer readers' editor

National Institute of Standards and Technology

...working with industry to develop

About NIST

- General information
- Budget, planning, and economic analysis
- NIST conferences
- NIST visitor info/directions
- NIST contacts/staff directory
- A-Z subject index

Programs

NIST Laboratories: provide measurement standards for U.S. industry.

Visit the Laboratories' web sites:

- Building and fire research

Baldrige National Quality Program: promotes organizational performance excellence

Relative Importance:
10000

Strength of Evidence:
12000

See page xxi for detailed descriptions of the rating scales

12340

12:8 Use Appropriate List Style

Guideline: Use bullet lists to present items of equal status or value, and numbered lists if a particular order to the items is warranted.

Comments: Bullet lists work best when the items do not contain an inherent sequence, order, or rank. Numbered lists assign each item in the list an ascending number, making the numerical order readily apparent. Numbered lists are especially important when giving instructions.

Sources: Coney and Steehouder, 2000; Detweiler and Omanson, 1996; Lorch and Chen, 1986; Narveson, 2001; Spyridakis, 2000.

Example:

Use bullets if your list items are of equal value, or if they have no discernable order.

Top 10 Gaining Queries
February 2003

1. nasa
2. valentines day
3. valentinstag
4. carnaval
5. michael jackson
6. american idol
7. great white
8. americas cup
9. world cup cricket
10. lana clarkson

Using numbered lists is appropriate when items are in a proscribed order, such as this list of "Top 10" queries.

Relative Importance:
10000

Strength of Evidence:
12340

Agencies

- A-Z Index
- Federal Branches
- State, Local & Tribal
- International

Contact Government

- e-Mail
- Phone
- In-Person
- More

Reference

- News Releases
- Federal Forms
- Laws & Regulations
- Questions About Government?
- More

Screen-based Controls (Widgets)

In order to interact with a website, users

usually require the use of screen-based controls (sometimes known as 'widgets'). Besides the pervasive link, commonly used screen-based controls include pushbuttons, radio buttons, check boxes, drop-down lists and entry fields. Designers should ensure that they use familiar widgets in a conventional or commonly-used manner.

When pushbuttons are used, ensure that they look like pushbuttons and that they are clearly labeled. In some cases, the pushbuttons will need to be prioritized to facilitate their proper use.

Radio buttons are used to select from among two or more mutually-exclusive selections. Check boxes should be used to make binary choices, e.g., 'yes' or 'no'. Drop-down lists are generally used to select one item from among many. To speed user performance, show default values when appropriate, and do not limit the number of viewable list box options.

Entry fields are used when filling-out forms and entering text into search boxes. Designers should try to minimize the amount of information entered by users. Each entry field should be clearly and consistently labeled, with the labels placed close to the entry fields. Designers should also clearly distinguish between "required" and "optional" data entry fields, and attempt to minimize the use of the Shift key.

To facilitate fast entry of information, designers should automatically place the cursor in the first data entry field, provide labels for each field (e.g., pounds, miles, etc.), and provide auto-tabbing functionality. In order to increase accuracy of data entry, partition long data items into smaller units, enable the software to automatically detect errors, and do not require case-sensitive data entries. Showing users their data entries can increase accuracy. For experienced users, the fastest possible entry of information will come from allowing users to use entry fields instead of selecting from list boxes.

Guideline: Distinguish clearly and consistently between required and optional data entry fields.

Comments: Users should be able to easily determine which data entry fields are required and which are optional. Many websites are currently using an asterisk in front of the label for required fields. Other sites are adding the word "required" near the label. One study found that bolded text is preferred when compared to the use of chevrons (>>>), checkmarks, or color to indicate required fields.

Sources: Bailey, 1996; Fowler, 1998; Morrell, et al., 2002; Tullis and Pons, 1997.

Example:

Relative Importance: 12345

Strength of Evidence: 12300

Asterisks (*) and labeling data entry field names with "required" are two popular and effective methods of distinguishing between optional and required data entry fields.

A field with an asterisk () before it is a required field.*

(required) First name:
 (required) Last name:
 Company/Organization:
 (required) Mailing Address:
 (required) City: State:
 Zip Code:
 (required) Country:
 (required) Phone(area code+number):
 FAX (area code+number):
 (required) E-mail:
 Comments:

Prefix:
 * First Name:
 * Last Name:
 * Address:
 *City:
 *State:
 *Zip:
 *Email Address:
 *Phone Number:


13:2 Detect Errors Automatically

Guideline: Use the computer to detect errors made by users.



Comments: Do not expect users to make correct entries. Anticipate possible user errors and allocate responsibility to the computer to identify these mistakes and suggest corrections. For example, if a date is entered as “February 31,” the computer should generate an error message asking for a revised entry. Some user entries may not need checking, or may not be amenable to computer checking.

Sources: Bailey, 1983; Pew and Rollins, 1975; Smith and Mosier, 1986.



Example:

 Please check your date. Type all dates Month/Day/Year using numerals or, to select a date from a calendar, click the **Calendar** button.

Departing: (MM/DD/YY)

 12:00 noon 

Returning: (MM/DD/YY)

 12:00 noon 

The screenshot shows a Google search interface. At the top, the Google logo is on the left, and navigation links for 'Advanced Search', 'Preferences', 'Language Tools', and 'Search Tips' are on the right. Below the logo is a search bar containing the text 'smithsonian', which is circled in red. To the right of the search bar is a 'Google Search' button. Below the search bar is a horizontal menu with tabs for 'Web', 'Images', 'Groups', 'Directory', and 'News'. Under the 'Web' tab, the search results for 'smithsonian' are displayed. The first result is 'Searched the web for smithsonian.' followed by 'Results 1 - 3 of 3'. Below this is a link to 'Try Google Answers to get help from expert researchers.' The second result is 'Did you mean: smithsonian' with 'smithsonian' circled in red. The third result is 'Un sport amérindien qui devient le sport national du Canada' with a link to '[Translate this page]'. Below this is a snippet of text: '... Pour en savoir plus, American Indian Lacrosse : Little Brother of War de Thomas Vennum Jr. (Smithsonian Institution Press, 1994, 360 p.).' followed by the URL 'www.histoireqc.com/dossiermois/fevrier99/crosse.html - 6k - Cached - Similar pages'. The fourth result is 'Gift Museum Shop Smithsonian Discounted Diamonds Earrings' with a snippet: '... museum mzeum smothsonian smithsonina museeum sbop sohp shp smitsonian muzeum smitheonian smithsknian musemu smit hsonian smithsonian smithxonian smithsonian ...' followed by the URL 'www.engagement-diamond.com/gift-museum-shop-smithsonian_discounted-diamonds-earrings.html - 17k - Cached - Similar pages'. At the bottom, there is a link 'Did you mean to search for: smithsonian' with 'smithsonian' circled in red.

Advanced Search Preferences Language Tools Search Tips

Google™ smithsonian Google Search

Web Images Groups Directory News

Searched the web for smithsonian. Results 1 - 3 of 3

Try Google Answers to get help from expert researchers.

Did you mean: smithsonian



Un sport amérindien qui devient le sport national du Canada - [Translate this page]

... Pour en savoir plus, American Indian Lacrosse : Little Brother of War de Thomas Vennum Jr. (Smithsonian Institution Press, 1994, 360 p.).
www.histoireqc.com/dossiermois/fevrier99/crosse.html - 6k - Cached - Similar pages

Gift Museum Shop Smithsonian Discounted Diamonds Earrings

... museum mzeum smothsonian smithsonina museeum sbop sohp shp smitsonian muzeum smitheonian smithsknian musemu smit hsonian smithsonian smithxonian smithsonian ...
www.engagement-diamond.com/gift-museum-shop-smithsonian_discounted-diamonds-earrings.html - 17k - Cached - Similar pages

Did you mean to search for: smithsonian

Relative Importance:

Strength of Evidence:


13:3 Minimize User Data Entry

Guideline: Do not require users to enter the same information more than once.

Comments: Requiring re-entry of data imposes an additional task on users, and increases the possibility of entry errors. When entries made by users on one page are required on another page, the computer should retrieve the original entries, rather than requiring re-entry of the same information. In general, require users to make as few entries as possible.

Sources: Czaja and Sharit, 1997; Smith and Mosier, 1986; Zimmerman, et al., 2002.

Example:

Clicking this button will prompt the server to copy information from the “Billing Address” column to the “Shipping Address” column, thus eliminating the need for users to re-input the data (if it is the same).

Step 1 of 4

BILLING ADDRESS

* E-mail:

* First Name:

* Last Name:

Company:

* Address:

Address2:

* City:

* State & Zip:

USA only

* Phone:

* Country:

Including US territories

USA

Foreign Postal Code:

Foreign Province/ Territory:

SHIPPING ADDRESS

Copy from Billing

Clear

* First Name:

* Last Name:

Company:

* Address:

Address2:

* City:

* State & Zip:

USA only

* Phone:

* Country:

Including US territories

USA

Foreign Postal Code:

Existing Yahoo! users

Enter your ID and password to sign in

Yahoo! ID:

Password:

☒

Remember my ID on this computer

Sign In

Mode: Standard | [Secure](#)

[Sign-in help](#)

[Password lookup](#)

This website minimizes user data entry by remembering IDs.

This website
minimizes user
data entry by
remembering IDs.

Relative Importance:
1 2 3 4 5

Strength of Evidence:
1 2 3 4 5

See page xxi
for detailed descriptions
of the rating scales

1234○

13:4 Label Data Entry Fields Clearly

Guideline: Display an associated label for each data entry field to help users understand what entries are desired.

Comments: Employ descriptive labels that clearly, concisely and unambiguously define the required entry. Make labels distinct enough so that readers do not confuse them with the data entries themselves. This can be done by bolding the labels or providing other visual cues such as an asterisk.

Do not create new jargon when labeling data entry fields. Use common terms (e.g., male, female) rather than arbitrary labels (e.g., Group 1, Group 2). If the meaning of a proposed label is in doubt, conduct usability testing with an appropriate sample of qualified users.

Sources: Pew and Rollins, 1975; Smith and Mosier, 1986.

Example:

Date Flag Needed by:

Prefix:

Firstname:

Lastname:

Flag flown for:

Address:

City:

State:

Zipcode:

Home Phone:

Business Phone:

Fax:

E-mail Address:

A good design—
Each data entry
field has an
associated
descriptive label.

Relative Importance:

12345

Strength of Evidence:

12300

13:5 Put Labels Close to Data Entry Fields

Guideline: Ensure that labels are close enough to their associated data entry fields so that users will recognize the label as describing the data entry field.

Comments: All labels and related information should be close to the data entry field to enable users to easily relate the label and entries required.

Sources: Engel and Granda, 1975; Evans, 1998; Galitz, 2002; Smith and Mosier, 1986.

Example:

Placing labels
very close to
the data entry
fields allows
users to rapidly
relate the label
and the
required entries.

Contact Information

* First Name

* Last Name

* Address:

* City * State * Zip Code

Phone Number

* Email Address

Email Format:

* 1. Establishment Name:

NOTE: In order for OSHA to fully process your complaint, complete and accurate information about the worksite is necessary.

* 2. Site Street:

* 3. Site City:

* 4. Site State

* 5. Site ZIP Code:

6. Mailing Address (if different):

7. Management Official:

8. Telephone Number:

9. Type of Business:

Placing labels
away from
the data entry
field slows
users' entry
rates.

13:6 Label Pushbuttons Clearly

Guideline: Ensure that a pushbutton's label clearly indicates its action.

Comments: The label of a pushbutton should clearly indicate the action that will be applied when the pushbutton is clicked. Common pushbutton labels include "Update," "Go," "Submit," "Cancel," "Enter," "Home," "Next," "Previous."

Sources: Bailey, 1996; Fowler, 1998; Marcus, Smilonich and Thompson, 1995.

Example:

Effective use of short phrases leaves no doubt in the user's mind as to what will happen when the pushbutton is clicked.

Example interface showing search options: Web, Directory, Photos. Below are links for Yellow Pages, White Pages, and Classifieds. A search button is labeled "Search".

Example interface for "My Horoscope". It asks for a birthday (MM DD YYYY) and has a pushbutton labeled "Get My Horoscope".

Example interface for "Enter your search information". It includes fields for Company name, CIK, File Number, State, and SIC. A pushbutton is labeled "Find Companies".

Relative Importance:
12340
Strength of Evidence:
12000

Example interface for searching by Business Entity Name or Registered Agent Name. Pushbuttons are labeled "Find Business Entity >>" and "Find Agent >>".

See page xxi
for detailed descriptions
of the rating scales

12300

13:7 Label Data Entry Fields Consistently

Guideline: Ensure that data entry labels are worded consistently, so that the same data item is given the same label if it appears on different pages.

Comments: If possible, employ consistent labeling conventions. For example, do not use single words or phrases for some labels and short sentences for others, or use verbs for some and nouns for others.

Sources: Evans, 1998; Mahajan and Shneiderman, 1997; Smith and Mosier, 1986.

Relative Importance:
12340
Strength of Evidence:
12300

13:8 Allow Users to See Their Entered Data

Guideline: Create data entry fields that are large enough to show all of the entered data without scrolling.

Comments: Users should be able to see their entire entry at one time. There always will be some users who will enter more data than can be seen without scrolling; however, try to minimize the need to scroll or move the cursor to see all the data for that field. If there is a character limit for a particular field, state that near the entry field.

Sources: Bailey, 1996; Czaja and Sharit, 1997; Fowler, 1998.

Example:

Text box expands vertically so that a user can see even very-long entries without having to scroll horizontally.

Data entry fields should be wide enough so that the user can see their entire entry without scrolling.

Example interface for "FirstGov website comments". It shows a feedback message: "I find the new layout much improved ... However, there are still some problems that you might want to address. First off, your use of fonts (and an apparent need to ...". A pushbutton is labeled "Submit Feedback".

Relative Importance:
12340
Strength of Evidence:
12300

* 1. Establishment Name: tute's Communication Technologies Branch

13:9 Display Default Values

Guideline: Display default values whenever a likely default choice can be defined.

Comments: When likely default values can be defined, offer those values to speed data entry. The initial or default item could be the most frequently selected item or the last item selected by that user. In general, do not use the default position to display a heading or label for that widget.

Sources: Ahlstrom and Longo, 2001; Bailey, 1996; Fowler, 1998; Marcus, Smilonich and Thompson, 1995; Smith and Mosier, 1986.

Example:

Title	Item	Quantity	Unit Price	Delete?
2002 IRS Tax CD-ROM.	IRS2002PUB1796A*CD	<input type="text" value="1"/>	\$22.00	<input type="checkbox"/>
		SubTotal:	\$22.00	
Continue Shopping		Update Basket	Clear Basket	

Relative Importance:

12340

Strength of Evidence:

12000

See page xxi
for detailed descriptions
of the rating scales

12340

13:10 Use a Minimum of Two Radio Buttons

Guideline: Never use one radio button alone.

Comments: Use at least two radio buttons together. If users can choose not to activate any of the radio button choices, provide a choice labeled "None."

Sources: Bailey, 1996; Fowler, 1998; Marcus, Smilonich and Thompson, 1995.

Relative Importance:

12340

Strength of Evidence:

12000

13:11 Use Radio Buttons for Mutually Exclusive Selections

Guideline: Provide radio buttons when users need to choose one response from a list of mutually exclusive options.

Comments: Radio buttons should be used when there is a need to select from among mutually exclusive items. Users should be able to click on the button or its text label to make their selection. Assign one of the radio button choices as the default when appropriate. One study reported that for making mutually exclusive selections, radio buttons elicit reliably better performance than drop-down lists. Radio buttons are also preferred over both open lists and drop-down lists.

Sources: Bailey, 1983; Bailey, 1996; Fowler, 1998; Galitz, 2002; Johnsgard, et al., 1995; Marcus, Smilonich and Thompson, 1995; Tullis and Kodimer, 1992.

Example:

When you use the U.S. Department of Education's (ED) (Please check only one)

If a user must be constrained to selecting one item in a list, employ radio buttons rather than check boxes.

- ☐ Student
- ☒ Teacher
- ☐ Education administrator or manager
- ☐ Parent or family member
- ☐ Researcher or analyst
- ☐ Policy maker or legislator
- ☐ Librarian
- ☐ Writer or reporter
- ☐ Other (please specify)

13:12 Use Check Boxes to Enable Multiple Selections

Guideline: Use a check box control to allow users to select one or more items from a list of possible choices.

Comments: Each check box should be able to be selected independently of all other check boxes. One study showed that for making multiple selections from a list of non-mutually exclusive items, check boxes elicit the fastest performance and are preferred over all other widgets. Users should be able to click on either the box or the text label.

Sources: Bailey, 1996; Fowler, 1998; Galitz, 2002; Johnsgard, et al., 1995; Marcus, Smilonich and Thompson, 1995.

Example: Check boxes are most appropriately used in these examples because users may wish to order more than one product or select more than one file format—convention dictates that check boxes be used when more than one item in a list may be selected.

Media Type: ☒ DVD
☐ CD-ROM 1
☐ CD-ROM 2
☒ CD-ROM 3
☐ CD-ROM 4
☒ CD-ROM 5
☐ 8mm high density tar tape

 Total cost of selections: \$

We want to provide information in for us understand how you prefer to use information and in what formats.

a. Short documents

How do you prefer to use short documents? (Please check all that apply)

- ☐ View/read online
- ☐ Download to view offline
- ☐ Download to print
- ☐ Download to edit or manipulate

What file format(s) do you prefer? (Please check all that apply)

- ☐ Hypertext markup language (.html)
- ☐ Plain ASCII text (.txt)
- ☐ Adobe Acrobat (.pdf)
- ☐ Compressed file (.zip)
- ☐ Other (please specify) _____

Relative Importance:

12300

Strength of Evidence:

12300

13:13 Use Familiar Widgets

Guideline: Use widgets that are familiar to your users and employ them in their commonly used manner.

Comments: Do not assume that all users are familiar with all available widgets. Unfamiliar widgets will slow some users, and cause others to not use the widget because they do not know how to make it work properly. For instance, one study showed that some users, particularly older users, do not know how to use a drop-down list box.

In choosing widgets, designers typically consider such issues as the amount of available screen "real estate," reducing the number of user clicks, and whether the user will be choosing one from among many items, or several items at once. Usability test the performance and acceptability of widgets to ensure they do not confuse or slow users.


Sources: Bailey, Koyani and Nall, 2000; Nall, Koyani and Lafond, 2001.

Example: The circled widget is used in an unconventional manner. Users might expect this widget to be a text entry box. However, when a user

Step 1 2 3

Select Car Class
 Please choose a car type, details will display

Economy 2/4 Door Car Auto A/C
 Compact 2/4 Door Car Auto A/C
 Intermediate 2/4 Door Car Auto A/C
 Standard 2/4 Door Car Auto A/C
 Full Size 2/4 Door Car Auto A/C
 Premium 2/4 Door Car Auto A/C
 Luxury 2/4 Door Car Auto A/C
 Mini Van Auto A/C
 Standard Convertible Auto A/C
 Standard Size Sport Utility 4x4
 Special 4-wheel Drive Auto A/C


 5x 3x
 Buick Regal or Similar

Reserve Now!

Country of Residence: United States
 Pick-up Location: SEATTLE ARPT
 Airport/Station Code: SEAT01
 Leave/Return Location Mark if Pick-up and Return stations are the same.
 Return Location: SEATTLE ARPT
 Airport/Station Code: SEAT01
 Pick-up Date: 17 February 2003
 Time: 9:00 AM PM
 Return Date: 24 February 2003
 Time: 9:00 AM PM
 Car Type: Full Size 2/4 Door Car Auto A/C
 Product Rate Code: Optional

Syllables: 31
Sentences: 7

Polysyllabic Words / 100 Words: 22.63
Sentences / 100 Words: 5.11
Words / Sentence: 19.58

☐ Print this now ..
 Refer to User Guide (and/or ReadMe File) for how to print this data at a later time.

☐ Continue ...

Blank entries reflect count calculations and formulas Applied or chosen for Disp

Relative Importance:

12300

Strength of Evidence:

12300

13:14 Use a Single Data Entry Method

Guideline: Design data entry transactions so that users can stay with one entry method as long as possible.

Comments: Do not have users shift back and forth between data entry methods. Requiring users to make numerous shifts from keyboard to mouse to keyboard can substantially slow their entry speed.

Sources: Czaja and Sharit, 1997; Engel and Granda, 1975; Foley and Wallace, 1974; Smith and Mosier, 1986.

Example: In this example, data entry methods are used consistently so that users do not have to shift back and forth between mouse entry and keyboard entry.

This design forces users to switch between keyboard entry and mouse entry methods, and will slow the user's data entry task.

Relative Importance:

12300

Strength of Evidence:

12340

13:15 Partition Long Data Items

Guideline: Partition long data items into shorter sections for both data entry and data display.

Comments: Partitioning long data items can aid users in detecting entry errors, and can reduce erroneous entries. For example, it is easier to enter and verify a ten digit telephone number when entered as three groups, NNN-NNN-NNNN. Similarly, ZIP+4 codes and social security numbers are best partitioned.

Sources: Mayhew, 1992; Smith and Mosier, 1986.

Example: The "Phone Number" entry field is partitioned correctly. However, the "ZIP+4" field should be broken out into two fields (one 5 digits long, and one 4 digits long, separated by a hyphen).

13:16 Do Not Make User-Entered Codes Case Sensitive

Guideline: Treat upper- and lowercase letters as equivalent when users are entering codes.

Comments: Do not make user-entered codes case sensitive unless there is a valid reason for doing so (such as increased security of passwords). If required, clearly inform users if they must enter codes in a case specific manner. When retaining data entered by users, show the data as it was entered by the user.

Sources: Ahlstrom and Longo, 2001; Smith and Mosier, 1986.

Relative Importance:

12300

Strength of Evidence:

12000

13:17 Place Cursor in First Data Entry Field

Guideline: Place (automatically) a blinking cursor at the beginning of the first data entry field when a data entry form is displayed on a page.

Comments: Users should not be required to move the mouse pointer to the first data entry field and click on the mouse button to activate the field. Designers should consider, however, that programming this automatic cursor placement might negatively impact the performance of screen reader software.

Sources: Ahlstrom and Longo, 2001; Smith and Mosier, 1986.

Relative Importance:

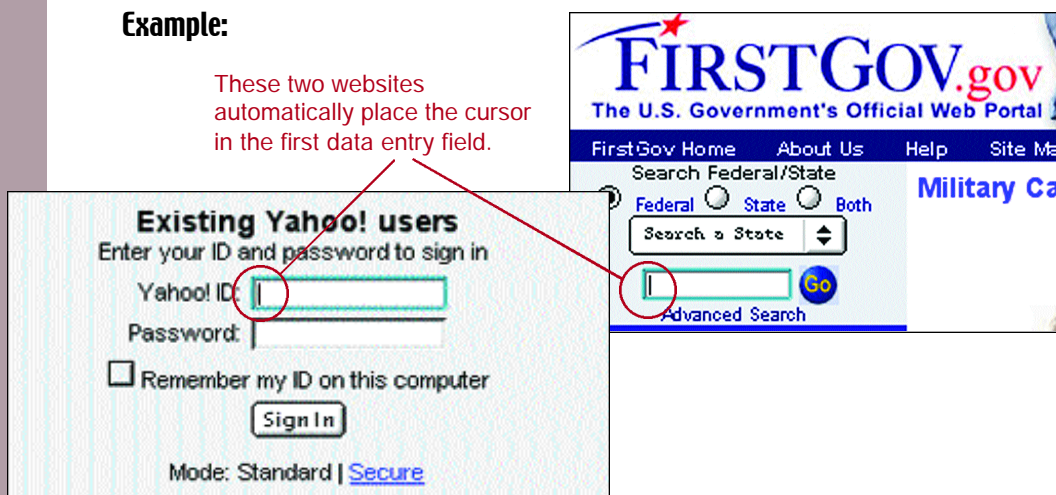
12300

Strength of Evidence:

12000

Example:

These two websites automatically place the cursor in the first data entry field.



See page xxi
for detailed descriptions
of the rating scales

12340

13:18 Provide Auto-tabbing Functionality

Guideline: Provide auto-tabbing functionality for frequent users with advanced Web interaction skills.

Comments: Auto-tabbing can significantly reduce data entry times for frequent users by not requiring them to manually tab from field to field.

Sources: Ahlstrom and Longo, 2001; Pew and Rollins, 1975; Smith and Mosier, 1986.

Relative Importance:

12300

Strength of Evidence:

12300

13:19 Label Units of Measurement

Guideline: When using data entry fields, specify the desired measurement units with the field labels rather than requiring users to enter them.

Comments: Designers should include units such as minutes, ounces, or centimeters, etc. as part of the data entry field label. This will reduce the number of keystrokes required of users (speeding the data entry process), and reduce the chance of errors.

Sources: Pew and Rollins, 1975; Smith and Mosier, 1986.

Relative Importance:

12300

Strength of Evidence:

12300

Example:

International Calculator

1. To which country are you mailing?

Select a Country

Tip: Typing the first letter of the country you want will jump the first country that starts with that letter.

2. How much does it weigh?

Pounds: 0 Ounces: 1

BODY MASS INDEX

Weight lbs.

Height feet inches

Calculate **Reset**

13:20 Ensure that Double-Clicking Will Not Cause Problems

Guideline: Ensure that double-clicking on a link will not cause undesirable or confusing results.

Comments: Many users double-click on a link when only one click is needed. Developers cannot stop users from double-clicking, but they should try to reduce the negative consequences of this behavior. Usability testing has indicated that if users start with quick double-clicks, they tend to continue to do this for most of the test. Sometimes, when both clicks are detected by the computer, the first click selects one link and the second click selects a second link, causing unexpected (i.e., puzzling) results.

Sources: Bailey, Koyani and Nall, 2000; Fakun and Greenough, 2002.

Relative Importance:

12300

Strength of Evidence:

12000

13:21 Do Not Limit Viewable List Box Options

Guideline: When using open lists, show as many options as possible.

Comments: Scrolling to find an item in a list box can take extra time. In one study, an open list that showed only three (of five) options was used. To see the hidden two items, users had to scroll. The need to scroll was not obvious to users who were not familiar with list boxes, and slowed down those that did know to scroll.

Sources: Bailey, Koyani and Nall, 2000; Zimmerman, et al., 2002.

Relative Importance:

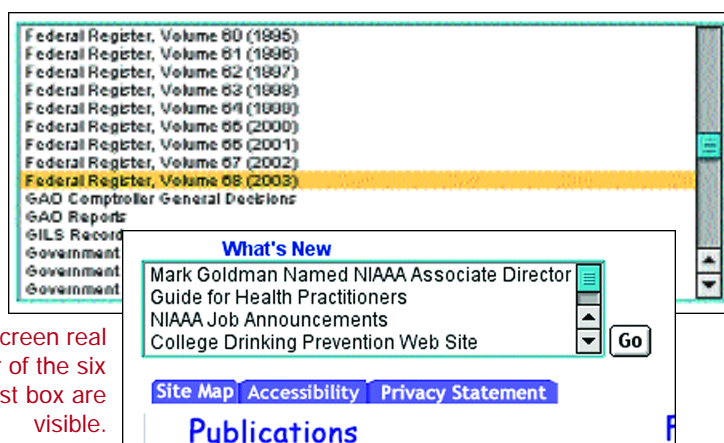
12000

Strength of Evidence:

12300

Example:

This open list shows as many options as possible given the amount of available screen real estate.



Despite plenty of screen real estate, only four of the six items in this list box are visible.

13:22 Use Open Lists to Select One from Many

Guideline: Use open lists rather than drop-down (pull-down) lists to select one from many.

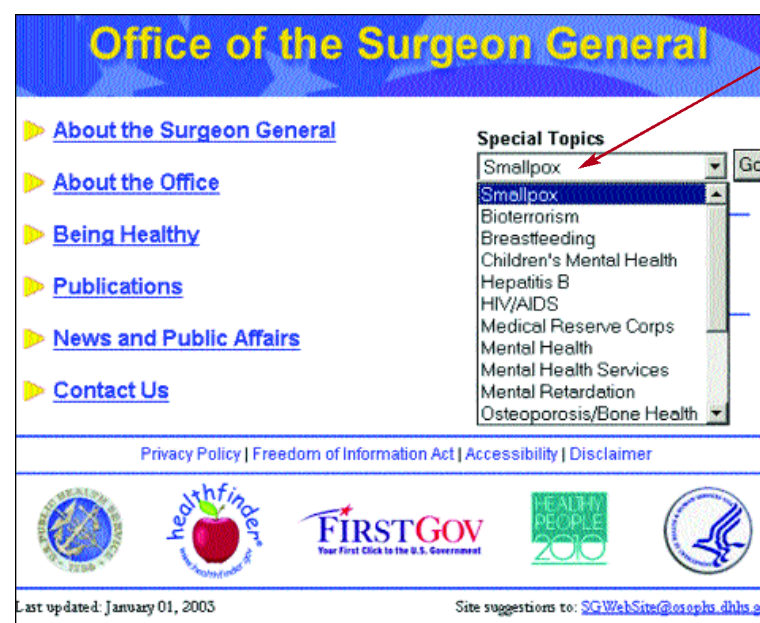
Comments: Generally, the more items users can see in a list (without scrolling), the faster their responses will be, and the fewer omission errors they will make. Ideally, users should be able to see all available items without scrolling.

When compared with drop-down lists, open lists tend to elicit faster performance primarily because drop-down lists require an extra click to open. However, if a list is extremely long, a drop-down list may be better. The available research does not indicate the upper number limit of items that should be displayed in a list.

Sources: Bailey, 1996; Fowler, 1998; Marcus, Smilonich and Thompson, 1995.

Example:

In this example, the designers opted to use a drop-down list to conserve screen real estate. This is a trade-off, however, as a drop-down list will slow users when compared with an open list.



13:23 Prioritize Pushbuttons

Guideline: Use location and highlighting to prioritize pushbuttons.

Comments: If one pushbutton in a group of pushbuttons is used more frequently than the others, put that button in the first position. Also make the most frequently used button the default action, i.e., that which is activated when users press the Enter key.

Sources: Bailey, 1996; Fowler, 1998; Marcus, Smilonich and Thompson, 1995.

Example:

The "Search" button is placed in the first position.

The Library of Congress

THOMAS
Legislative Information on the Internet

In the Spirit of Thomas Jefferson, a service of The Library of Congress

Congress Now: [House Floor This Week](#) | [House Floor Now](#) | [Senate Schedule](#)

Search Bill Text 108th Congress (2003-2004):
 Bill Number Word/Phrase **Search**

Quick Links: [House](#) | [House Clerk](#) | [House Directory](#) | [Senate](#) | [Senate Directory](#) | [GPO](#)

LINKS	LEGISLATION	CONGRESSIONAL RECORD	COMMITTEE INFORMATION
About THOMAS	Bill Summary & Status 93rd - 108th	This Congress by Date	Committee Reports 104th - 108th
THOMAS FAQ	Bill Text 101st - 108th	Text Search 101st - 108th	House Committees Homepages
Congress & Legislative Agencies	Public Laws 93rd - 108th	Index 104th - 108th	Senate Committees Homepages
How Congress Makes Laws House Senate		Roll Call Votes 101st - 108th	

Relative Importance:
12000

Strength of Evidence:
12000

See page xxi for detailed descriptions of the rating scales

12340

13:24 Minimize Use of the Shift Key

Guideline: Design data entry transactions to minimize use of the Shift key.

Comments: If possible, designers should not require users to enter characters that require the use of the Shift key. Using the Shift key imposes a demand for extra user attention and time. For example, the designer can include symbols such as the dollar or percent sign near data entry fields rather than requiring users to enter those characters. Designers also can treat upper- and lowercases as equivalent when entered by users.

Sources: Card, Moran and Newell, 1980b; John, 1996; Smith and Mosier, 1986.

Relative Importance:
10000

Strength of Evidence:
12340

13:25 Use Data Entry Fields to Speed Performance

Guideline: Require users to enter information using data entry fields (instead of selecting from list boxes) if you are designing to speed human performance.

Comments: At least two studies have compared the effectiveness of text entry versus selection (list boxes) for entering dates and making airline reservations. Both studies found text entry methods were faster and preferred over all other methods. However, use of text entry fields tends to elicit more errors.

Sources: Bailey, 1996; Czaja and Sharit, 1997; Fowler, 1998; Gould, et al., 1988; Gould, et al., 1989; Greene, et al., 1988; Greene, et al., 1992; Marcus, Smilonich and Thompson, 1995; Tullis and Kodimer, 1992.

Relative Importance:
10000

Strength of Evidence:
12345

Example:

Enter Field Name

GoFind

*First Name:
 MI:
 *Last Name:
 *Address:
 *City:
 *State:
 *Zip:
 *Country:
 *Phone 1:
 Phone 2:
 Fax:
 Beeper:
 mail Address:

If users' entries cannot be easily defined or constrained (for example, their street address or a particular search term), use entry fields. However, if entries can be defined and errors reduced (state or country of residence) use list boxes. Be aware that alternating between these two entry methods will slow the user.

Graphics, Images, and Multimedia

Graphics are used on many, if not most, Web

pages. When used appropriately, graphics can facilitate learning. An important image to show on most pages of a site is the organization's logo. When used appropriately, images, animation, video and audio can add tremendous value to a website. When animation is used appropriately, it is a good idea to introduce the animation before it begins.

Many images require a large number of bytes that can take a long time to download, especially at slower connection speeds. When images must be used, designers should ensure that the graphics do not substantially slow page download times. Thumbnail versions of larger images allow users to preview images without having to download them.

Sometimes it is necessary to label images to help users understand them. Usability testing should be used to help ensure that website images convey the intended message. In many cases, the actual data should be included with charts and graphs to facilitate fast and accurate understanding.

It is usually not a good idea to use images as the entire background of a page. Complex background images tend to slow down page loading, and can interfere with reading the foreground text.

Experienced users tend to ignore graphics that they consider to be advertising. Designers should ensure that they do not create images that look like banner ads. Also, they should be careful about placing images in locations that are generally used for advertisements.

14:1 Use Video, Animation, and Audio Meaningfully

Guideline: Use video, animation, and audio only when they help to convey, or are supportive of, the website's message or other content.

Comments: Multimedia elements (such as video, animation, and audio) can easily capture the attention of users; therefore, it is important to have clear and useful reasons for using multimedia to avoid unnecessarily distracting users. Some multimedia elements may take a long time to download, so it is important that they be worth the wait.

Used productively, multimedia can add great value to a site's content and help direct users' attention to the most important information and in the order that it is most useful.

Sources: Campbell and Maglio, 1999; Chen and Yu, 2000; Faraday and Sutcliffe, 1997; Faraday, 2000; Faraday, 2001; Harrison, 1995; Nielsen, 2000; Park and Hannafin, 1993; Reeves and Rickenberg, 2000; Spinillo and Dyson, 2000/2001; Sundar, Edgar and Mayer, 2000.

Relative Importance:
12340

Strength of Evidence:
12345

14:2 Include Logos

Guideline: Place your organization's logo in a consistent place on every page.

Comments: Users are frequently unaware when they click through to a different website. Having a logo on each page provides a frame of reference throughout a website so that users can easily confirm that they have not left the site. Ideally, the logo should be in the same location on each page; many designers place the logo in the top left corner.

Sources: Adkisson, 2002; Farkas and Farkas, 2000; Marchionini, 1995; Nall, Koyani and Lafond, 2001; Nielsen, 1999d; Omanson, Cline and Nordhielm, 2001; Omanson, et al., 1998; Osborn and Elliott, 2002; Spool, et al., 1997.

Relative Importance:
12340

Strength of Evidence:
12340

Example:



14:3 Limit Large Images Above the Fold

Guideline: Do not fill the entire first screenful with one image if there are screenfuls of text information below the fold.

Comments: Large graphics that cover most of the screen at the top of the page suggest to users that there is no more information below the graphic. In one study, because a graphic filled the screen, some users did not use the scrollbar to scroll down to more content. In fact, some users did not even suspect that more information might be located below the fold.

Sources: Bailey, Koyani and Nall, 2000; Chen and Yu, 2000; Golovchinsky and Chignell, 1993; Nielsen and Tahir, 2002.

Example: As the scroll bar shows, there are several additional screenfuls of information below this large navigation graphic—users may not look at the scroll bar, however, and thus may miss that information.

Relative Importance:

12340

Strength of Evidence:

12300



14:4 Limit the Use of Images

Guideline: Use images only when they are critical to the success of a website.

Comments: Ensure that a website's graphics add value and increase the clarity of the information on the site. Certain graphics can make some websites much more interesting for users, and users may be willing to wait a few extra seconds for them to load. Users tend to be most frustrated if they wait several seconds for a graphic to download, and then find that the image does not add any value. Some decorative graphics are acceptable when they do not distract the user.

Sources: Badre, 2002; Evans, 1998; Nielsen, 1997e; Nielsen, 1999b; Nielsen, 2000; Spool, et al., 1997; Wen and Beaton, 1996; Williams, 2000.

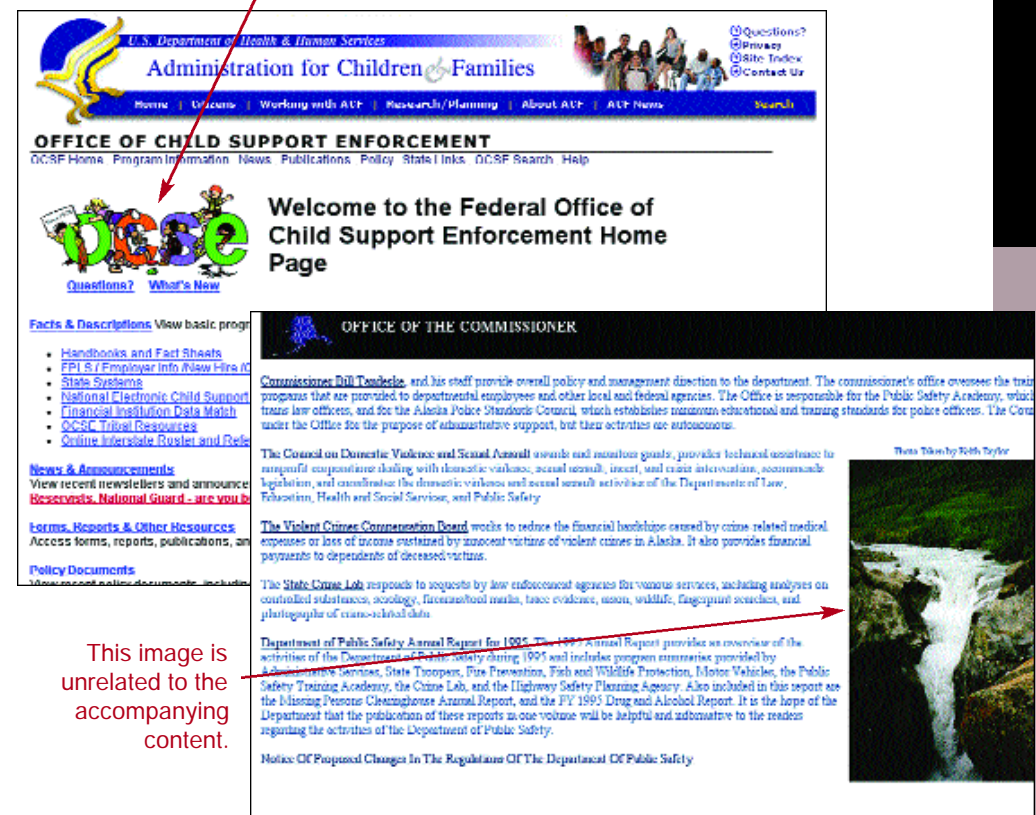
Example: The placement of this image disrupts the left justification of the other page elements and it is visually distracting, drawing the user's attention from the site's content.

Relative Importance:

12300

Strength of Evidence:

12300



This image is unrelated to the accompanying content.

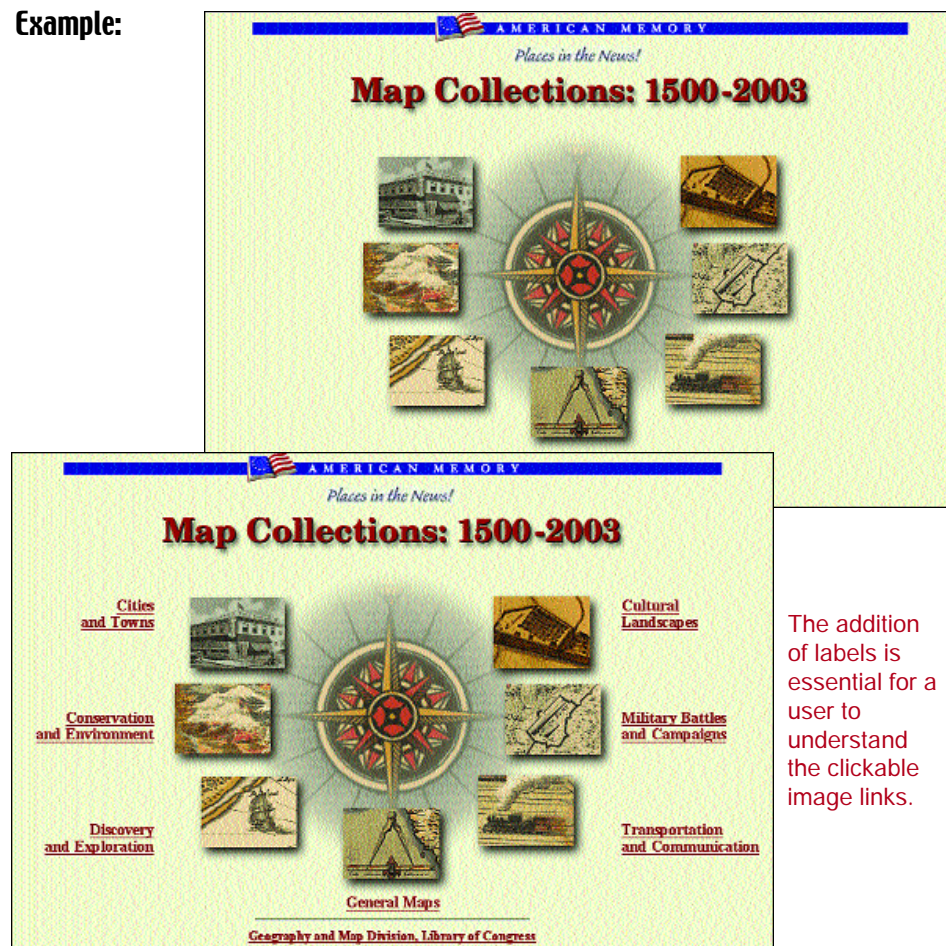
14:5 Label Clickable Images

Guideline: Ensure that all clickable images are either labeled or readily understood by typical users.

Comments: Occasional or infrequent users may not use an image enough to understand or remember its meaning. Ensure that images and their associated text are close together so that users can integrate and effectively use them together. Additionally, alt text should accompany every clickable image.

Sources: Booher, 1975; Evans, 1998; Hackman and Tinker, 1957; Spool, et al., 1997; Tinker and Paterson, 1931; Vaughan, 1998; Williams, 2000.

Example:



Relative Importance:

12300

Strength of Evidence:

12340

14:6 Ensure that Images Do Not Slow Downloads

Guideline: Take steps to ensure that images on the website do not slow page download times unnecessarily.

Comments: User frustration increases as the length of time spent interacting with a system increases. Users tolerate less delay if they believe the task should be easy for the computer. One study reported that users rated latencies of up to five seconds as "good." Delays over ten seconds were rated as "poor." Users rate pages with long delays as being less interesting and more difficult to scan.

To speed download times, use several small images rather than a single large image on a page; use interlacing or progressive images; and use several of the same images. Designers should also minimize the number of different colors used in an image and put HEIGHT and WIDTH pixel dimension tags in an image reference. To achieve faster response time for users with dial-up modems, limit page size to less than 30,000 bytes.

Sources: Bouch, Kuchinsky and Bhatti, 2000; Farkas and Farkas, 2000; Marchionini, 1995; Martin and Corl, 1986; Nielsen, 1996a; Nielsen, 1997a; Nielsen, 1999c; Nielsen, 2000; Perfetti and Landesman, 2001a; Ramsay, Barbesi and Preece, 1998; Sears, Jacko and Borella, 1997; Selvidge, Chaparro and Bender, 2001; Shneiderman, 1984; Tullis, 2001.

Relative Importance:

12300

Strength of Evidence:

12345

14:7 Use Thumbnail Images to Preview Larger Images

Guideline: When viewing full-size images is not critical, first provide a thumbnail of the image.

Comments: By providing thumbnails of larger images, users can decide whether they want to wait for the full image to load. By using thumbnails, those who do not need or want to see the full image are not slowed down by large image downloads. Link the thumbnail image to the full-size copy.

Sources: Levine, 1996; Nielsen and Tahir, 2002.

Example:



Relative Importance:

12300

Strength of Evidence:

12000

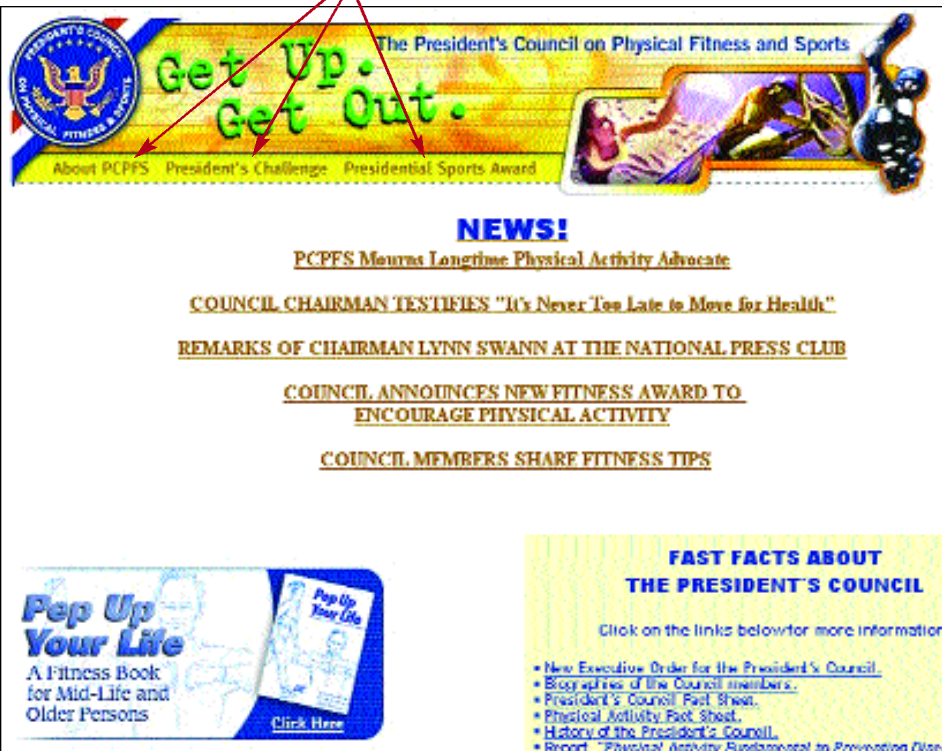
14:8 Graphics Should Not Look Like Banner Ads

Guideline: Do not make important images look like banner advertisements or gratuitous decorations.

Comments: In a recent study, a graphic developed to inform users about access to live help was not clicked because many users thought it was an advertisement. Even though the graphic was larger than most other graphics on the page, some users missed the item completely because the graphic looked too much like a decoration or a banner advertisement.

Sources: Ahmadi, 2000; Badre, 2002; Bayles, 2002; Benway, 1998; Ellis and Kurniawan, 2000.

Example: This graphic, which contains three major, linked headers, looks like a banner advertisement. Consequently, users may skip over this design element, thus missing the headers.



Relative Importance:
12300
Strength of Evidence:
12340

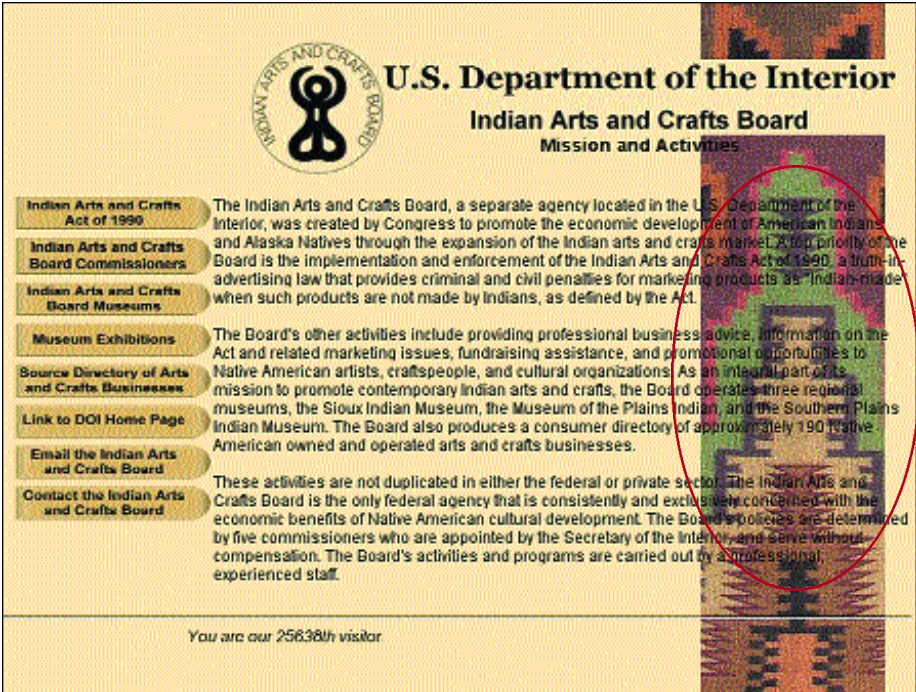
14:9 Use Simple Background Images

Guideline: Use background images sparingly and make sure they are simple, especially if they are used behind text.

Comments: Background images can make it difficult for users to read foreground text. A single, large, complex background image (including a picture) can substantially slow page download rates. If background images must be employed, use small, simple images with "tiling," and/or keep the image resolution as low as possible.

Sources: Boyntoin and Bush, 1956; Cole and Jenkins, 1984; Detweiler and Omanson, 1996; Hackman and Tinker, 1957; Jenkins and Cole, 1982; Levine, 1996; Levy, et al., 1996; Spencer, Reynolds and Coe, 1977a; Spencer, Reynolds and Coe, 1977b; Tinker and Paterson, 1931; Tinker, 1963.

Example: Complex graphics can obscure text, making it very difficult for users to read the site's content.



Relative Importance:
02300
Strength of Evidence:
02345

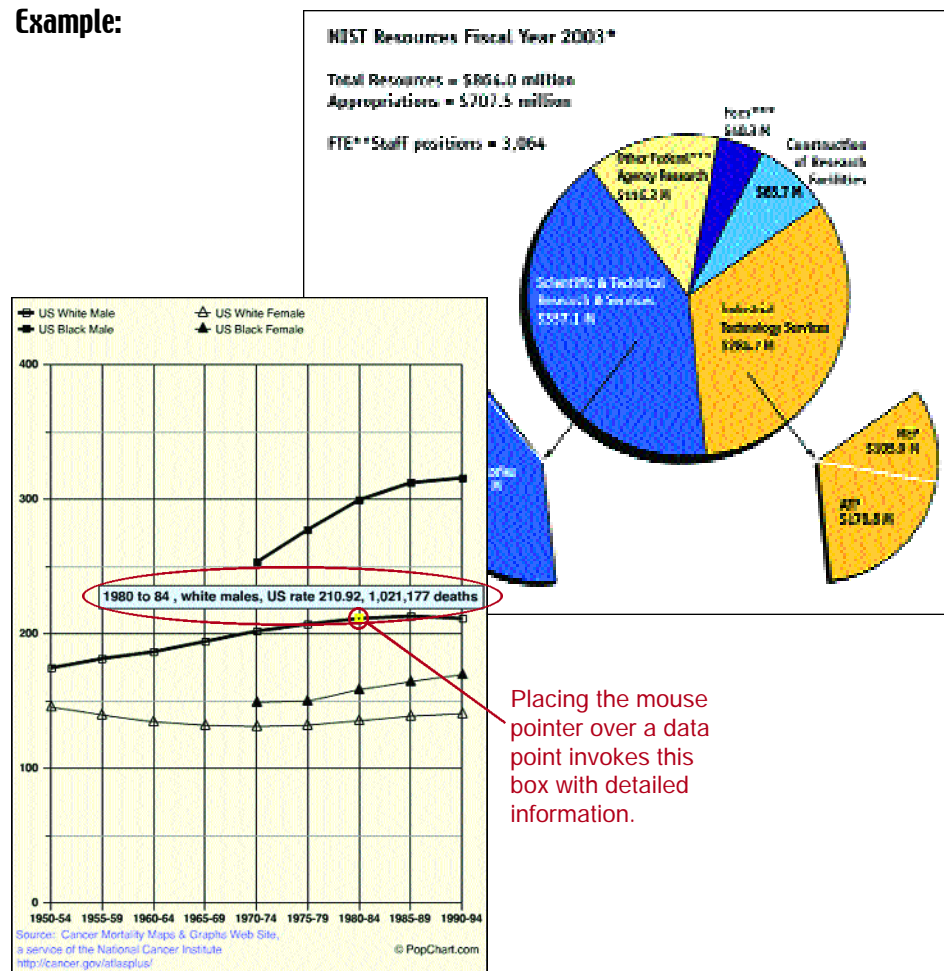
14:10 Include Actual Data with Data Graphics

Guideline: Include actual data values with graphical displays of data when precise reading of the data is required.

Comments: Adjacent numeric annotation might be added to the ends of displayed bars on a bar graph, or to mark the points of a plotted curve. Some displays may require complete data annotation while others may require annotation only for selected data elements.

Sources: Pagulayan and Stoffregen, 2000; Powers, et al., 1961; Smith and Mosier, 1986; Spool, et al., 1997; Tufte, 1983.

Example:



See page xxi for detailed descriptions of the rating scales

12340

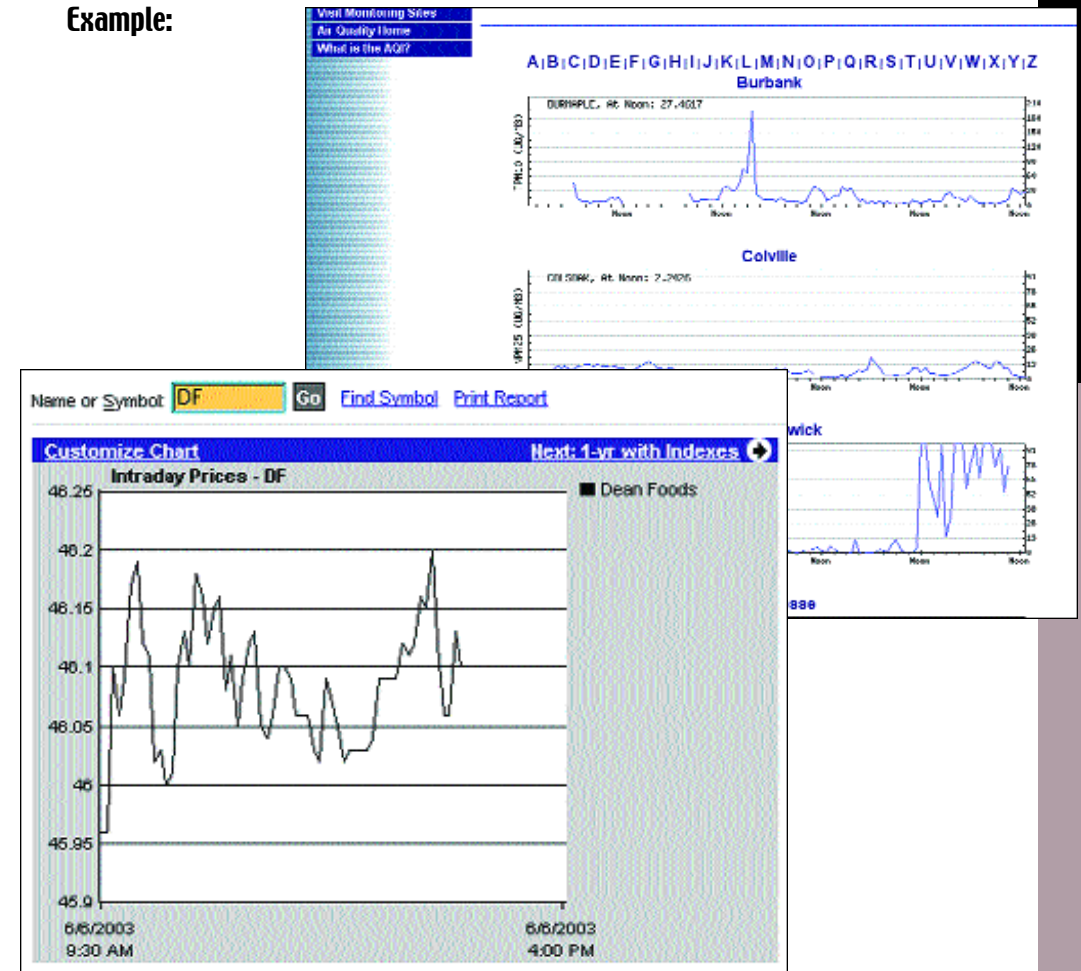
14:11 Display Monitoring Information Graphically

Guideline: Use a graphic format to display data when users must monitor changing data.

Comments: Whenever possible, the computer should handle data monitoring and should call abnormalities to the users' attention. When that is not possible, and a user must monitor data changes, graphic displays will make it easier for users to detect critical changes and/or values outside the normal range.

Sources: Hanson, et al., 1981; Kosslyn, 1994; Powers, et al., 1961; Smith and Mosier, 1986; Tullis, 1981.

Example:



14:12 Introduce Animation

Guideline: Provide an introductory explanation for animation prior to it being viewed.

Relative Importance:

12000

Strength of Evidence:

12300

Comments: Providing an explanation of animation before it begins will help users better integrate the animation and associated content. In other words, briefly explain to users what they are about to see before they see it. Also, allow animation to be user-controlled. The user should be able to pause, stop, replay, or ignore animation or other multimedia elements.

Sources: Evans, 1998; Faraday and Sutcliffe, 1999.

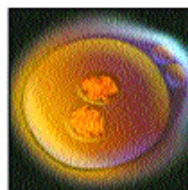
Example: Each video clip is accompanied by text that explains to the user what they are about to view. In addition, this website allows the user to control when to start the video clip.

A Life Unfolds Inside the Womb

During the first 26 weeks of pregnancy, when the mother may only be beginning to appear to others to be pregnant, the sperm and egg cells have developed into a recognizable human fetus that can hear the sound of its mother's voice. Watch the videos below to follow the astonishing process of development.

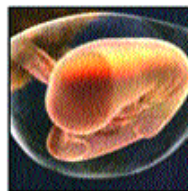
When Two Cells Become One

What happens at the moment of conception? Embryologist Ian Gallicano, M.D., describes the delicate cellular choreography that creates a new life. [Watch the video animation.](#)



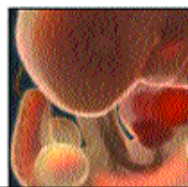
At Four Weeks

At four weeks from gestation, the human embryo could easily be mistaken for that of another animal, but its bond with its mother is already complex, and becoming more so with each passing day. [Watch the video animation.](#)



At Five Weeks

Barely more than a month old, the embryo's heart is beating and, as in a perfectly timed orchestral composition, the other organs develop in turn. [Watch the video animation.](#)



See page xxi for detailed descriptions of the rating scales
12340

14:13 Ensure Website Images Convey Intended Messages

Guideline: Ensure that website images convey the intended message to users, not just to designers.

Relative Importance:

12000

Strength of Evidence:

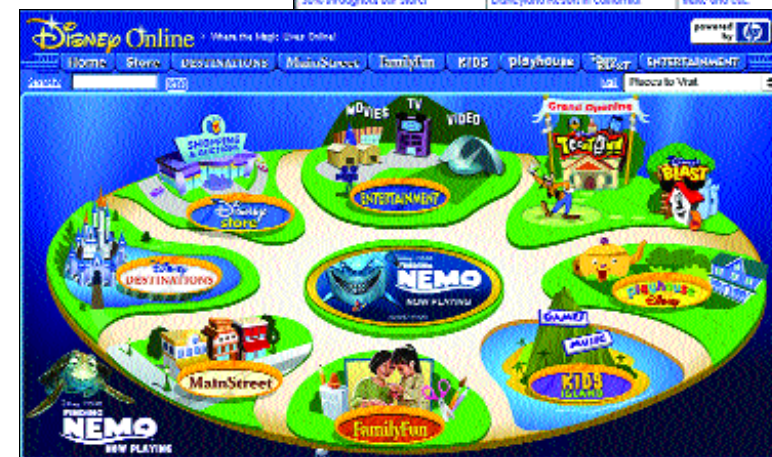
12300

Comments: Users and designers tend to differ in what they think is appropriate to convey a message. When attempting to select the best graphic from a set of graphics, users tend to select those that most other users would have selected (i.e., those that look familiar), while most developers favor graphics that look more artistic.

Sources: Ahmadi, 2000; Evans, 1998; Nielsen and Tahir, 2002; Spool, et al., 1997.

Example:

One study found that seventy-five percent of users are able to find information on the "lite" site shown on the right, whereas only seventeen percent could find the same information on the graphics-intensive site below.



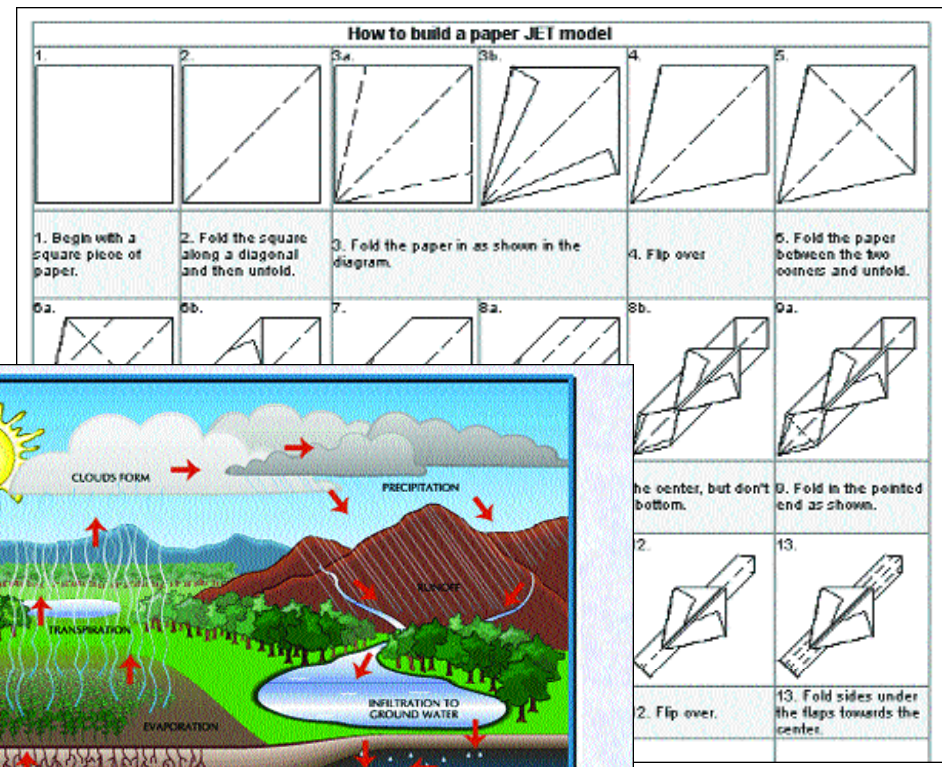
14:14 Use Images to Facilitate Learning

Guideline: To facilitate learning, use images rather than text whenever possible.

Comments: The superiority of pictures over text in a learning situation appears to be strong. For example, pictures of common objects are recognized and recalled better than their textual names. Exceptions seem to occur when the items are conceptually very similar (e.g., all animals or tools), or when items are presented so quickly that learners cannot create verbal labels.

Sources: Golovchinsky and Chignell, 1993; Krull and Watson, 2002; Levy, et al., 1996; Lieberman and Culpepper, 1965; Nelson, Reed and Walling, 1976; Paivio and Csapo, 1969; Paivio, Rogers and Smythe, 1968; Rodden, et al., 2001; Williams, 1993.

Example:



Relative Importance:
10000
Strength of Evidence:
12345

These pictures and illustrations facilitate faster learning of key concepts.

See page xxi for detailed descriptions of the rating scales
12340

14:15 Emulate Real-World Objects

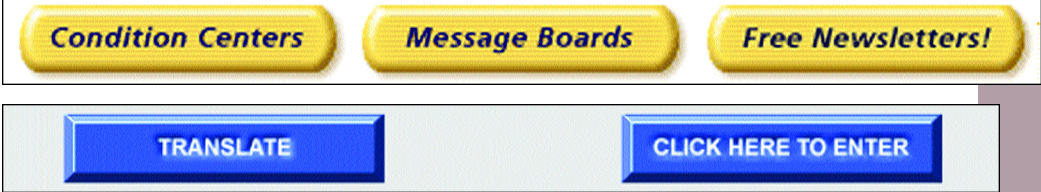
Guideline: Use images that look like real-world items when appropriate.

Comments: Images (e.g., pushbuttons and navigation tabs) are likely to be considered as links when they are designed to emulate their real-world analogues. If a designer cannot make such images emulate real-world objects, the image may require at least one additional clickability cue, such as a descriptive label (like "Home" or "Next") or placement on the page. A text label can help inform users about a link's destination, but in one study some users missed this type of image link, even those that contained words, because the words were not underlined.

Sources: Ahmadi, 2000; Bailey, 2000b; Galitz, 2002; Nolan, 1989.

Example:

These control items are designed to look like real-world items. The buttons below, for example, look like the buttons you might find on an Automated Teller Machine. The control item image to the right controls video on a website, and thus is designed to look like a control on a VCR or DVD player.



Relative Importance:
10000
Strength of Evidence:
12340

Writing Web Content

"Vigorous writing is concise. A sentence should contain no unnecessary words, a paragraph no unnecessary sentences, for the same reason that a drawing should have no unnecessary lines and a machine no unnecessary parts." – William Strunk Jr., in Elements of Style

Content is the most important part of a website.

Content is the most important part of a website. If the content does not provide the information needed by users, the website will provide little value no matter how easy it is to use the site.

When preparing prose content for a website, use familiar words and avoid the use of jargon. If acronyms and abbreviations must be used, ensure that they are clearly understood by typical users and defined on the page.

Minimize the number of words in a sentence and sentences in a paragraph. Make the first sentence (the topic sentence) of each paragraph descriptive of the remainder of the paragraph. State clearly the temporal sequence of instructions. Also, use upper- and lowercase letters appropriately, write in an affirmative, active voice, and limit prose text on navigation pages.

Guideline: Do not use unfamiliar or undefined acronyms or abbreviations on websites.

Comments: Acronyms and abbreviations should be used sparingly and must be defined in order to be understood by all users. It is important to remember that users who are new to a topic are likely to be unfamiliar with the topic's related acronyms and abbreviations. Use the following format when defining acronyms or abbreviations: Physician Data Query (PDQ). Acronyms and abbreviations are typically defined on first mention, but remember that users may easily miss the definition if they scroll past it or enter the page below where the acronym or abbreviation is defined.

Sources: Ahlstrom and Longo, 2001; Evans, 1998; Morrell, et al., 2002; Nall, Koyani and Lafond, 2001; Nielsen and Tahir, 2002; Tullis, 2001.

Example: Undefined acronyms on a homepage may leave users confused regarding the site's contents or purpose.

Relative Importance:

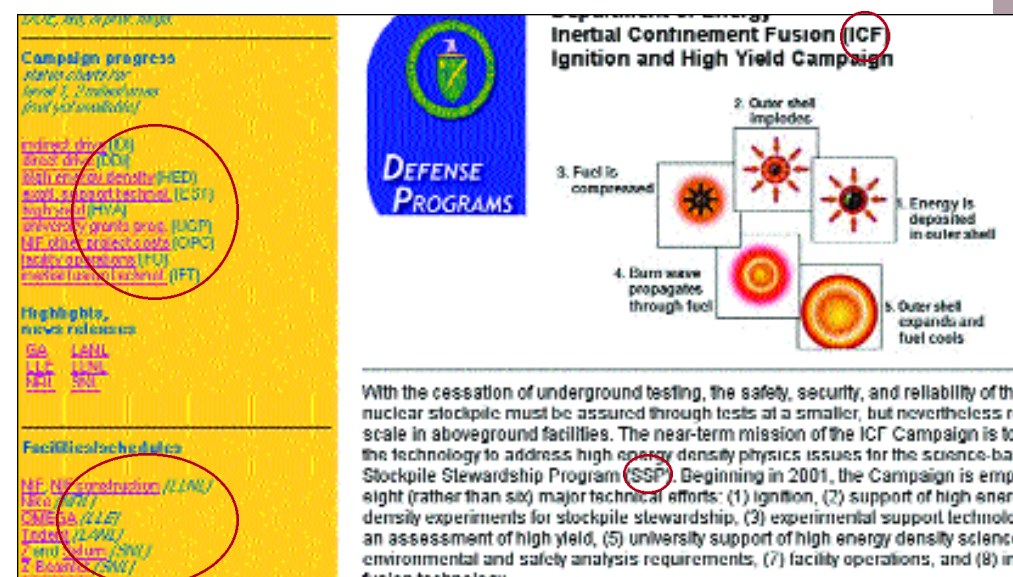
12340

Strength of Evidence:

12000



This detailed, highly-technical content page is designed for experts and not novice users. However, the designer has still defined each acronym and abbreviation on the page.



15:2 Use Abbreviations Sparingly

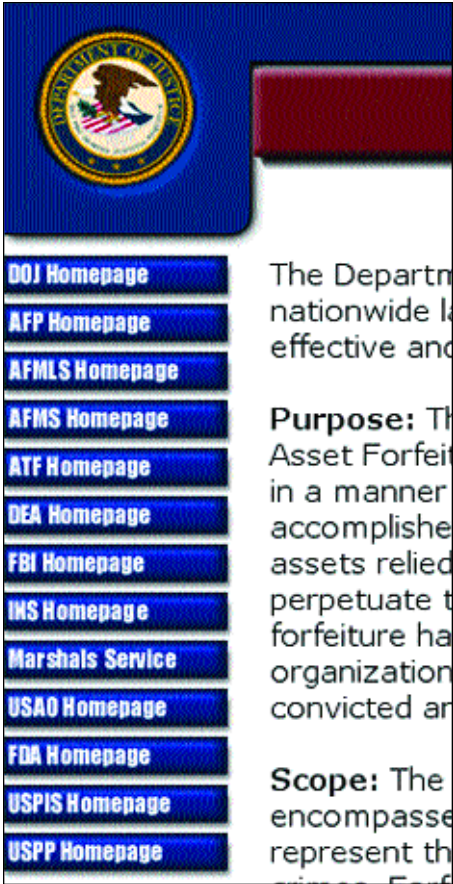
Guideline: Show complete words rather than abbreviations whenever possible.

Comments: The only times to use abbreviations are when they are significantly shorter, save needed space, and will be readily understood by typical users. If users must read abbreviations, choose only common abbreviations.

Sources: Ahlstrom and Longo, 2001; Engel and Granda, 1975; Evans, 1998; Smith and Mosier, 1986.

Example:

If abbreviations are in common usage (FBI, DEA) then it is acceptable to use them. However, if an abbreviation is not in common usage (USPIS, USPP), the complete title should be used.



Relative Importance:
12340
Strength of Evidence:
12000

15:3 Use Familiar Words

Guideline: Use words that are frequently seen and heard.

Comments: Use words that are familiar to, and used frequently by, typical users. Words that are more frequently seen and heard are better and more quickly recognized. There are several sources of commonly used words (see Kucera and Francis, 1967 and Leech et al., 2001 in the Sources section).

Familiar words can be collected using open-ended surveys, by viewing search terms entered by users on your site or related sites, and through other forms of market research.

Sources: Furnas, et al., 1987; Kucera and Francis, 1967; Leech, Rayson and Wilson, 2001; Spyridakis, 2000; Whissell, 1998.

Relative Importance:
12340
Strength of Evidence:
12300

15:4 Use Mixed Case with Prose

Guideline: Display continuous (prose) text using mixed upper- and lowercase letters.

Comments: Reading text is easier when capitalization is used conventionally to start sentences and to indicate proper nouns and acronyms. If an item is intended to attract the user's attention, display the item in all uppercase, bold, or italics. Do not use these methods for showing emphasis for more than one or two words or a short phrase because they slow reading performance when used for extended prose.

Sources: Breland and Breland, 1944; Engel and Granda, 1975; Moskel, Erno and Shneiderman, 1984; Poulton and Brown, 1968; Smith and Mosier, 1986; Spyridakis, 2000; Tinker and Paterson, 1928; Tinker, 1955; Tinker, 1963; Vartabedian, 1971; Wright, 1977.

Example:

This block of text is an example of displaying continuous (prose) text using mixed upper- and lowercase letters. It's not difficult to read.

THIS BLOCK OF TEXT IS AN EXAMPLE OF DISPLAYING CONTINUOUS (PROSE) TEXT USING ALL UPPERCASE LETTERS. IT'S MORE DIFFICULT TO READ.

Relative Importance:
12340
Strength of Evidence:
12345

15:5 Avoid Jargon

Guideline: Do not use words that typical users may not understand.

Comments: Terminology plays a large role in the user's ability to find and understand information. Many terms are familiar to designers and content writers, but not to users. In one study, some users did not understand the term "cancer screening." Changing the text to "testing for cancer" substantially improved users understanding.

To improve understanding among users who are accustomed to using the jargon term, it may be helpful to put that term in parentheses. A dictionary or glossary may be helpful to users who are new to a topic, but should not be considered a license to frequently use terms typical users do not understand.

Sources: Cockburn and Jones, 1996; Evans, 1998; Horton, 1990; Mayhew, 1992; Morkes and Nielsen, 1997; Morkes and Nielsen, 1998; Nall, Koyani and Lafond, 2001; Schramm, 1973; Spyridakis, 2000; Tullis, 2001; Zimmerman and Prickett, 2000; Zimmerman, et al., 2002.

Example: This is a website often visited by the public. As such, the site language should be accessible and free of jargon.

Relative Importance:

12340

Strength of Evidence:

12340

Headlines

Latest News

From the National Institutes of Health

General/Overviews

Clinical Trials

Diagnosis/Symptoms

Disease Management

When searching google.com/unclesam for "thyroid cancer," this page is the first returned "hit." Thus, this is the first government page that a user may encounter. To accommodate these users, the page content should be free of jargon and words that a new user might not understand.

See page xxi for detailed descriptions of the rating scales

12340

15:6 Make First Sentences Descriptive

Guideline: Include the primary theme of a paragraph, and the scope of what it covers, in the first sentence of each paragraph.

Comments: Users tend to skim the first one or two sentences of each paragraph when scanning text.

Sources: Bailey, Koyani and Nall, 2000; Lynch and Horton, 2002; Morkes and Nielsen, 1997; Morkes and Nielsen, 1998; Spyridakis, 2000.

Example: Descriptive first sentences set the tone for each of these paragraphs, and provide users with an understanding of the topic of each section of text.

Relative Importance:

12300

Strength of Evidence:

12340

Programs

Emerging Threats

The Emerging Threats program develops high-impact responses to national security challenges. As the 9/11 terrorist attacks only begin to indicate, advanced technologies – chemical, biological, nuclear, and informational – create the potential for greater harm than ever to our nation.

Sandia's integrated science expertise allows us to develop technologically superior weapons and security systems. From basic research to global intelligence, Sandia supports numerous government and industry agencies in combating terrorism and threats against our armed forces and homeland. We apply our scientific and engineering knowledge to:

- Identify and neutralize biological and chemical agents, whether released accidentally or intentionally
- Disable explosive devices, including land mines and bombs
- Detect and defeat hard-to-find offensive threats, including weapons storage facilities and mobile targets
- Generate precise battlefield information

Sandia remains ready to provide our nation with the technical capability to respond to threats against our armed forces, our nation, and our survival as a free nation.

Protecting America's Infrastructure – Sandia is working to raise construction standards to produce structures that can better withstand a wide range of threats. In the Oklahoma City bombing, most of the victims were killed not by the blast but by the building when its nine floors collapsed like a house of cards.

15:7 Use Active Voice

Guideline: Compose sentences in active rather than passive voice.

Comments: Users benefit from simple, direct language. Sentences in active voice are typically more concise than sentences in passive voice. Strong verbs help the user know who is acting and what is being acted upon. In one study, people who had to interpret federal regulation language spontaneously translated passive sentences into active sentences in order to form an understanding of the passages.

Sources: Flower, Hayes and Swarts, 1983; Horton, 1990; Palermo and Bourne, 1978; Palmquist and Zimmerman, 1999; Redish, Felker and Rose, 1981; Smith and Mosier, 1986; Spinillo and Dyson, 2000/2001; Spyridakis, 2000; Wright, 1977; Zimmerman and Clark, 1987.

Example: Active Voice Example Passive Voice Example
 "John hit the baseball." "The baseball was hit by John."

Relative Importance:

12300

Strength of Evidence:

12340

15:8 Write Instructions in the Affirmative

Guideline: As a general rule, write instructions in affirmative statements rather than negative statements.

Comments: When giving instructions, strive to tell users what to do (see a dentist if you have a toothache), rather than what to avoid doing (avoid skipping your dentist appointment if you have a toothache). If the likelihood of making a wrong step is high or the consequences are dire, negative voice may be clearer to the user.

Sources: Greene, 1972; Herriot, 1970; Krull and Watson, 2002; Palmquist and Zimmerman, 1999; Smith and Mosier, 1986; Wright, 1977; Zimmerman and Clark, 1987.

Example: An example of negative voice pointing out consequences to the user.

Relative Importance:

12300

Strength of Evidence:

12000

Message successfully posted by: 156.40.129.142 (Logged!).

IMPORTANT: Do **NOT** press BACK - If you come back to this page, your message will be posted a second time!

15:9 Limit the Number of Words and Sentences

Guideline: To optimize reading comprehension, minimize the number of words in sentences, and the number of sentences in paragraphs.

Comments: To enhance the readability of prose text, a sentence should not contain more than twenty words. A paragraph should not contain more than six sentences.

Sources: Bailey, 1996; Bailey, Koyani and Nall, 2000; Bouma, 1980; Chervak, Drury and Ouellette, 1996; Evans, 1998; Kincaid, et al., 1990; Marcus, 1992; Mills and Caldwell, 1997; Nielsen, 1997c; Palmquist and Zimmerman, 1999; Rehe, 1979; Spyridakis, 2000; Zimmerman and Clark, 1987.

Example: This is an example of how to optimize reading comprehension. The number of words in a sentence is minimized, and there are few sentences in each paragraph.

Relative Importance:

12300

Strength of Evidence:

12340

Smallpox Vaccine: What you should know

There's been a lot in the news about the smallpox vaccine. What is it and how does it work?

The smallpox vaccine was used until the early 1970s to wipe out smallpox worldwide. Much like other vaccines, the smallpox vaccine protects against infection by helping your body develop immunity to the smallpox virus. The smallpox vaccine is made from a live virus that's very similar to the smallpox virus. The vaccine doesn't cause smallpox, but it can cause life-threatening problems in some people.

If smallpox was wiped out long ago, why am I hearing about the vaccine now?

A smallpox epidemic hasn't occurred for many years, but there are still stocks of the virus in laboratories throughout the world. It is possible that these stocks of the smallpox virus could be used as weapons in a [bioterrorism](#) attack. The United States government has developed a plan to help protect Americans against smallpox in the event of bioterrorism.

What is a Smallpox Response Team?

A Smallpox Response Team is a group of medical professionals who have received the smallpox vaccine. In the event of a smallpox attack, these people could continue to provide health care to others. The Department of Health and Human Services (DHHS) is now working with state and local governments to form these response teams.

Should everyone get the smallpox vaccine?

For most people, whether they are vaccinated against smallpox depends on whether there has been an outbreak of the disease. In most cases, the vaccine causes mild side effects, such as soreness around the vaccination site, fever and body aches. A small percent of people will suffer serious side effects and may even die. Thus, if there hasn't been an outbreak of smallpox, the risks associated with the vaccine don't outweigh the benefits for most people. The following groups of people are more likely to have severe reactions and should only be vaccinated if actually exposed to smallpox:

15:10 Limit Prose Text on Navigation Pages

Guideline: Do not put a lot of prose text on navigation pages.

Comments: When there are many words on navigation pages, users tend to rapidly scan for specific words or begin clicking on many different links, rather than reading the text associated with the links.

Sources: Bailey, Koyani and Nall, 2000; Evans, 1998; Morkes and Nielsen, 1998; Nielsen, 2000; Spyridakis, 2000.

Example: The lack of prose text allows navigation elements to take center stage on this navigation page.

Relative Importance:

12300

Strength of Evidence:

12300

The screenshot shows the USDA NFAC Main Menu. The left sidebar contains a list of links, including 'Home', 'NFAC Learning', 'About', 'News & Info', 'News', 'Involvement', 'Community', 'Investment', 'Strategic Plan', 'Contacts', 'Related Links', 'Service Center', 'Modernization', 'SCA', 'RIS', 'Info', 'Training', 'FAQs', 'State Office Location', and 'Privacy'. The main content area is titled 'Welcome to the Food and Agriculture Council Homepage.' and contains several paragraphs of prose text. A red circle highlights the 'NFAC Main Menu' link in the left sidebar.

The large volume of prose text forces navigation links (the primary purpose of the page) into the left panel.

See page xxi for detailed descriptions of the rating scales

12340

15:11 Make Action Sequences Clear

Guideline: When describing an action or task that has a natural order or sequence (assembly instructions, troubleshooting, etc.), structure the content so that the sequence is obvious and consistent.

Comments: Time-based sequences are easily understood by users. Do not force users to perform or learn tasks in a sequence that is unusual or awkward.

Sources: Czaja and Sharit, 1997; Farkas, 1999; Krull and Watson, 2002; Morkes and Nielsen, 1998; Nielsen, 2000; Smith and Mosier, 1986; Wright, 1977.

Example:

The screenshot shows a software download page for Adobe Acrobat Reader. The page is divided into two steps. Step 1 is 'Select an Acrobat Reader version' and Step 2 is 'Include the following options for your Acrobat Reader software'. The steps are numbered 1, 2, and 3, with a red circle around the numbers. The page also includes a 'DOWNLOAD' button and a 'SELECT AN OPTION' button.

Relative Importance:

12000

Strength of Evidence:

12340

Content Organization

After ensuring that content is useful, well-written

and in a format that is suitable for the Web, it is important to ensure that the information is clearly organized. In some cases, the content on a site can be organized in multiple ways to accommodate multiple audiences.

Organizing content includes putting critical information near the “top” of the site, grouping related elements, and ensuring that all necessary information is available without slowing the user with unneeded information. Content should be formatted to facilitate scanning, and to enable quick understanding.

16:1 Organize Information Clearly

Relative Importance:

12345

Strength of Evidence:

12340

Guideline: Organize information at each level of the website so that it shows a clear and logical structure to typical users.

Comments: Designers should present information in a structure that reflects user needs and the site’s goals. Information should be well-organized at the website level, page level, and paragraph or list level.

Good website and page design enables users to understand the nature of the site’s organizational relationships and will support users in locating information efficiently. A clear, logical structure will reduce the chances of users becoming bored, disinterested, or frustrated.

Sources: Benson, 1985; Clark and Haviland, 1975; Detweiler and Omanson, 1996; Dixon, 1987; Evans, 1998; Farkas and Farkas, 2000; Keyes, 1993; Keyes, Sykes and Lewis, 1988; Lynch and Horton, 2002; Nielsen and Tahir, 2002; Redish, 1993; Redish, Felker and Rose, 1981; Schroeder, 1999; Spyridakis, 2000; Tiller and Green, 1999; Wright, 1987; Zimmerman and Akerelrea, 2002; Zimmerman, et al., 2002.

Example:

This design clearly illustrates to the user the logical structure of the website. The structure is built on the user’s needs—namely, completing a form in ten steps.

FAFSA Steps:

- 1 Info About You
- 2 Your Finances
- 3 Your Student Status
- 4 Your Parents' Info
- 5 Your Household Info
- 6 Schools to Receive Results
- 7 Review Completed FAFSA
- 8 Signatures
- 9 Submit Your FAFSA
- 10 Finish

Need help with this page? This page may scroll downward.

Step 1 questionnaires relate to your personal demographic and marital status information, as well as school related and financial aid eligibility information that applies to you (the Student).

1. Last Name:

2. First Name:

3. Middle Initial:

4. Permanent Street Address (include Apt. Number):

Only use letters (A-Z), numbers (0-9), periods (.), commas (,), apostrophes ('), dashes (-), number symbols (#), at symbols (@), percent symbols (%), ampersands (&), slashes (/), or blanks (spaces). No other characters are allowed. Use street address abbreviations such as APT (apartment) or AVE (avenue) if the address extends beyond the space provided.

5. City (and Country if not U.S.):

6. State:

7. Zip Code:

8. Your Social Security Number: (Date can not be entered in this field.)

Need help with this page? Previous Next



16:2 Put Critical Information Near the Top of the Website

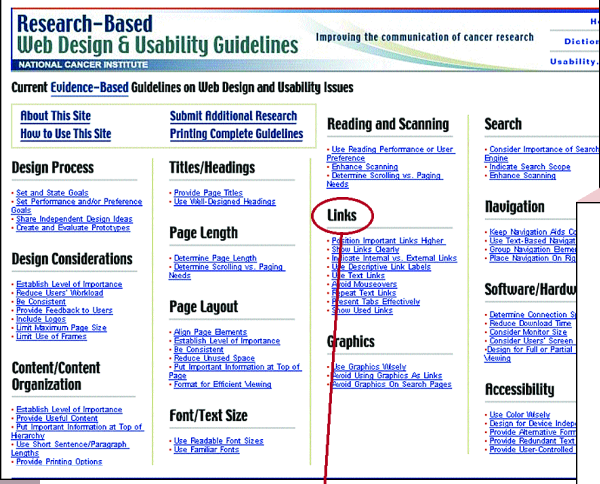
Guideline: Put critical information high in the hierarchy of a website.

Comments: Critical information should be provided as close to the homepage as possible. This reduces the need for users to click deep into the site and make additional decisions on intervening pages. The more steps (or clicks) users must take to find the desired information, the greater the likelihood they will make an incorrect choice. Important information should be available within two or three clicks of the homepage.

Sources: Evans, 1998; Levine, 1996; Nall, Koyani and Lafond, 2001; Nielsen and Tahir, 2002; Spyridakis, 2000; Zimmerman, et al., 1996; Zimmerman, et al., 2002.

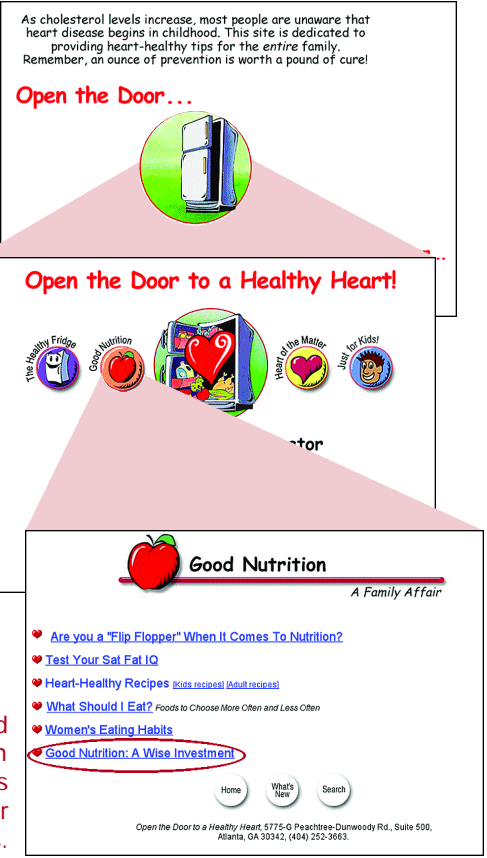
Example:

Relative Importance:

Strength of Evidence:




A key topic area, "Links," is placed on the homepage, and its content is only one click away.

This important topic, "Good Nutrition," is not represented on the homepage. The topic's content is only available after several clicks.



16:3 Facilitate Scanning

Guideline: Structure each content page to facilitate scanning: use clear, well-located headings; short phrases and sentences; and small readable paragraphs.

Comments: Websites that are optimized for scanning can help users find desired information. Users that scan generally read headings, but do not read full text prose—this results in users missing information when a page contains dense text.



Studies report that about eighty percent of users scan any new page. Only sixteen percent read word-by-word. Users spend about twelve percent of their time trying to locate desired information on a page.

To facilitate the finding of information, place important headings high in the center section of a page. Users tend to scan until they find something interesting and then they read. Designers should help users ignore large chunks of the page in a single glance.

Sources: Bailey, Koyani and Nall, 2000; Byrne, John, et al., 1999; Evans, 1998; Morkes and Nielsen, 1997; Morkes and Nielsen, 1998; Nielsen, 1997e; Nielsen, 2000; Schriver, 1997; Spool, et al., 1997; Spyridakis, 2000; Sticht, 1985; Sullivan and Flower, 1986; Toms, 2000; Zimmerman, et al., 1996.

Example:

This page facilitates scanning.

Relative Importance:

Strength of Evidence:


Recording the Test Design

PDA's and computers require different scenarios.

Method:
 The CIS Web site was used to determine potential scenarios. Conversations with employees from the CIS regional offices determined job responsibilities and tasks that occurred on a day-to-day basis.

Lessons Learned:
 Scenarios designed for the Web did not necessarily translate to the PDA because PDA users saw the ability to access cancer content on handhelds as a supplement to the information available online. This altered their behavior and usage patterns on PDA.

For example, users requested that the topics be arranged by cancer type in order to access the content more quickly.

Hardware and software on PDA's vary significantly.
 Usability testing on PDA's needs to take into account variability in hardware and software.


For example, there are four different pathways to input data onto the PDA:

1. Character Recognition
2. On-screen keyboard
3. Portable, foldout keyboard
4. Thumb keyboards (Blackberry)

This may have a significant effect on usability testing for performance.

Users are aware of the limited memory capability in their PDA's.
 This has an effect on the likelihood of the user downloading content, especially large amounts of it. Communicating the level of remaining memory on PDA's and size of content to download may help alter the user's behavior.

Handheld	Operating System Version	Expandable Memory Potential

See page xxi for detailed descriptions of the rating scales


16:4 Group Related Elements

Guideline: Group all related information and functions in order to decrease time spent searching or scanning.

Comments: All information related to one topic should be grouped together. This minimizes the need for users to search or scan the site for related information. Users will consider items that are placed in close spatial proximity to belong together conceptually. Text items that share the same background color typically will be seen as being related to each other.

Sources: Ahlstrom and Longo, 2001; Cakir, Hart and Stewart, 1980; Faraday, 2000; Gerhardt-Powals, 1996; Kahn, Tan and Beaton, 1990; Kim and Yoo, 2000; Nall, Koyani and Lafond, 2001; Niemela and Saarinen, 2000; Nygren and Allard, 1996; Spyridakis, 2000.

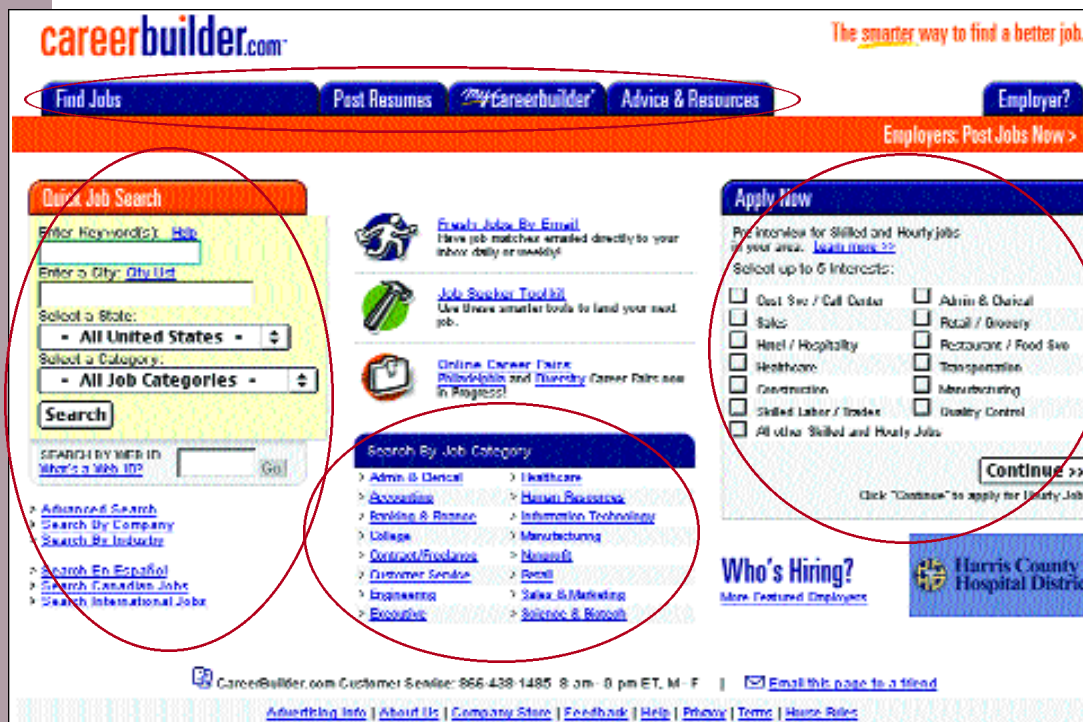
Example: This site organizes information well by grouping core navigation elements and key topic areas. These features allow users to search and scan for information faster.

Relative Importance:

12340

Strength of Evidence:

12345



16:5 Display Only Necessary Information

Guideline: Limit page information only to that which is needed by users while on that page.

Comments: Do not overload pages or interactions with extraneous information. Displaying too much information may confuse users and hinder assimilation of needed information. Allow users to remain focused on the desired task by excluding information that task analysis and usability testing indicates is not relevant to their current task. When user information requirements cannot be precisely anticipated by the designer, allow users to tailor displays online.

Sources: Engel and Granda, 1975; Mayhew, 1992; Morkes and Nielsen, 1998; Powers, et al., 1961; Smith and Mosier, 1986; Spyridakis, 2000; Stewart, 1980; Tullis, 1981.

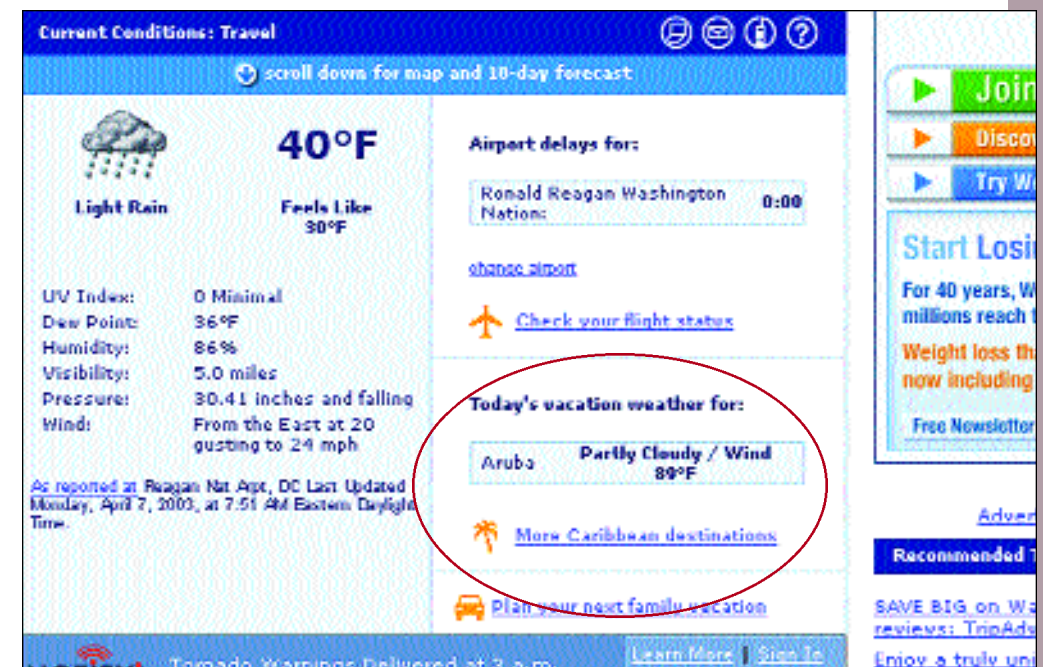
Example: An example of extraneous information. In this case, the user is looking for a weather forecast for Washington, D.C. The site provides this information, but also indicates today's vacation weather for Aruba—this information is extraneous to the user's original task.

Relative Importance:

12340

Strength of Evidence:

12340



16:6 Ensure that Necessary Information is Displayed

Guideline: Ensure that all needed information is available and displayed on the page where and when it is needed.

Comments: Users should not have to remember data from one page to the next or when scrolling from one screenful to the next. Heading information should be retained when users scroll data tables, or repeated often enough so that header information can be seen on each screenful.

Sources: Engel and Granda, 1975; Smith and Mosier, 1986; Spyridakis, 2000; Stewart, 1980; Tullis, 1983.

Example: This header row disappears as users scroll down the table. This can negatively effect users' performance on the site by exceeding their "working memory" capacity.

Relative Importance:
12340

Strength of Evidence:
12000

U.S. Environmental Protection Agency

Air Permits

Recent Additions | Contact Us | Other Services | Search:

CPA Home > Air & Radiation > Air Quality Criteria & Standards > Permits > Title V Permit Issuance Status > Title V Permit Issuance Status Data Table

TITLE V PERMIT ISSUANCE STATISTICS -- December 31, 2002

	# Subsequent Recycled TS Permits	# Subsequent Issued TS Permits	% Issued (TS only)
REGION 1			
Connecticut	99	63	64%
Massachusetts	187	87	47%
Maine	71	50	70%
New Hampshire	55	45	82%
Rhode Island	40	28	53%
Vermont	23	20	87%
TOTAL	484	291	60%
REGION 2			
New Jersey	2501	1581	48%
New York	5391	4645	50%
Puerto Rico	56	211	37%
Virgin Islands	7	11	16%
TOTAL	800	706	71%
REGION 3			
District of Columbia	34	34	100%
Delaware	00	01	80%
Maryland	167	120	72%

See page xxi for detailed descriptions of the rating scales

12340

16:7 Format Information for Multiple Audiences

Guideline: Provide information in multiple formats if the website has distinct audiences who will be interested in the same information.

Comments: Information can be provided in varying formats and at different levels of detail on the same site. For example, information about cancer can be presented in differing ways for physicians and patients.

When segmenting content for two or more distinct groups of users, allow users from each audience to easily access information intended for other audiences. One study showed that users want to see information that is intended for a health professional audience, as well as for a patient or consumer audience. Users want access to all versions of the information without first having to declare themselves as a health professional, a patient, a caregiver, etc. To accommodate these users, audiences were not segmented until they reached a page where links to multiple versions of a document (i.e., technical, non-technical) were provided.

Sources: Nall, Koyani and Lafond, 2001; Zimmerman and Prickett, 2000; Zimmerman, et al., 2002.

Example: These are examples of ways to provide different audiences access to information.

N

- Paranasal Sinus and Nasal Cavity Cancer (PDQ®) [patients] [health professionals]
- Nasopharyngeal Cancer (PDQ®): Treatment [patients] [health professionals]
- Neuroblastoma (PDQ®): Treatment [patients] [health professionals]
- Adult Non-Hodgkin's Lymphoma (PDQ®): Treatment [patients] [health professionals]

NIMH
National Institute of Mental Health

- Mental Disorder Information
- Clinical Trials
- Material en Español
- Science on Our Minds 2001
- Research Fact Sheets
- Statistics
- Science Education
- Reports of the Surgeon General
- Welcome
- News & Events
- Clinical Trials
- Funding Opportunities
- For the Public
- For Practitioners
- For Researchers
- Intramural Research
- For NIH Staff
- Contact Us

Paranasal Sinus and Nasal Cavity Cancer (PDQ®): Treatment

Printable Version

Two versions of this document are available. Select a tab below to switch between versions.
Date Last Modified: 08/23/2002

patient health professional

16:8 Design Quantitative Content for Quick Understanding

Guideline: Design quantitative information to reduce the time required to understand it.

Comments: Make appropriate use of tables, graphics, and visualization techniques to hasten the understanding of information. Presenting quantitative information in a table (rather than a graph) generally elicits the best performance; however, there are situations where visualizations will elicit even better performance. Usability testing can help to determine when users will benefit from using tabular data, graphics, tables, or visualizations.

Sources: Galitz, 2002; Gerhardt-Powals, 1996; Kosslyn, 1994; Meyer, 1997; Meyer, Shamo and Gopher, 1999; Meyer, Shinar and Leiser, 1997; Tufte, 1983.

Example:

Relative Importance:

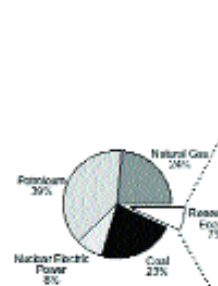
12300

Strength of Evidence:

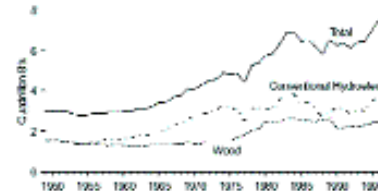
12345

Figure 10.1 Renewable Energy Consumption by Source

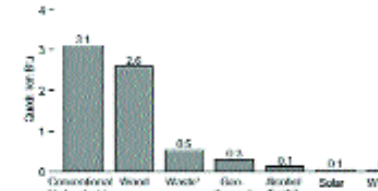
Renewable Energy as Share of Total Energy, 2000



Major Sources of Renewable Energy Consumption, 1950-2000

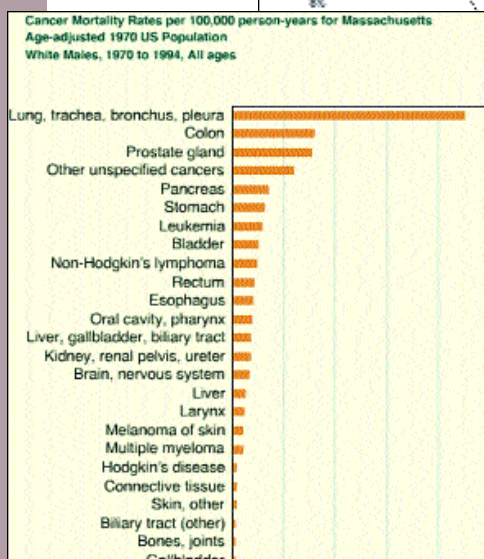


Renewable Energy Consumption by Source, 2000



This is a case where displaying information using graphs and bars allows users to discern the importance of data much more quickly than when it is presented in a table format.

Presenting numerical data as bar charts may speed up the user's understanding of data.



16:9 Use Color for Grouping

Guideline: Use color to help users understand what does and does not go together.

Comments: Color coding permits users to rapidly scan and quickly perceive patterns and relationships among items. Items that share the same color will be considered as being related to each other, while items with prominent color differences will seem to be different.

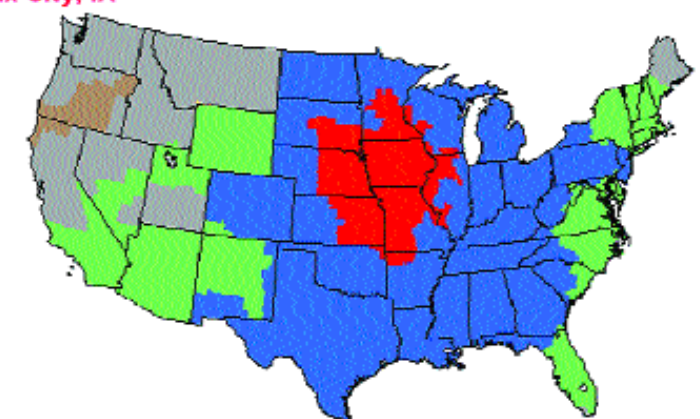
People can distinguish up to ten different colors that are assigned to different categories, but it may be safer to use no more than five different colors for category coding. If more than ten different colors are used, the effects of any particular relationship will be lost.

Do not use color alone to convey information.

Sources: Carter, 1982; Christ, 1975; Engel and Granda, 1975; Haubner and Neumann, 1986; Murch, 1985; Nygren and Allard, 1996; Smith, 1962; Smith, 1963; Smith, Farquhar and Thomas, 1965.

Example:

Color Coded Service Map
Sioux City, IA



Service Standards		FedEx Freight East Service Center	
<ul style="list-style-type: none"> Next Day 2nd Day 3rd Day 	<ul style="list-style-type: none"> 5th Day 6th Day 7th Day 	2225 Murray Street Sioux City, IA 51111 Local: 712-259-3236	
Inside WETA WETA News Production Svcs. Our History Work With Us! Volunteer Internships Careers at WETA Officers & Board Directions	WETA Digital Search Listings WETA Cooks WETA Kids Schedule About DTV FAQ Glossary Productions Around Town Hometown Heroes Washington Week	Service Standards Music Listings Classical Music News/Talk Variety Listen Live Who's Who Online Features Desert Island Picks Audio Archives Staff Articles Contexts Virtual Studio Tour	Local Events Projects LD OnLine Teacher Resources Overview Heroes Voices Potomac MediaSmart CapAccess

Many websites allow users to search for

information contained in the site. Users access the search capability by entering one or more keywords into an entry field—usually termed a ‘search box.’ When there are words in the website that match the words entered by users, users are shown where in the website those words can be found.

Each page of a website should allow users to conduct a search. Usually it is adequate to allow simple searches without providing for the use of more advanced features. Users should be able to assume that both upper- and lowercase letters will be considered as equivalent when searching. The site’s search capability should be designed to respond to terms typically entered by users. Users should be notified when multiple search capabilities exist.

Where many users tend to conduct similar searches, sometimes it works best to provide search templates. Users tend to assume that any search they conduct will cover the entire site and not a subsite. The results presented to users as a result of searching should be useful and usable.

Guideline: Provide a search option on each page of a content-rich website.

Comments: A search option should be provided on all pages where it may be useful—users should not have to return to the homepage to conduct a search. Search engines can be helpful on content-rich websites, but do not add value on other types of sites.

Designers should be careful not to rely too heavily on search engines. They are not a substitute for good content organization, and do not always improve users’ search performance. Designers should carefully consider the advantages and disadvantages of including a search engine, and whether their website lends itself to automated searches.

Sources: Detweiler and Omanson, 1996; Farkas and Farkas, 2000; Levine, 1996; Nielsen, 1996a; Nielsen, 1997e; Nielsen, 1999d; Spool, et al., 1997.

Example: As users delve deeper into the site’s content, the search capability remains immediately available.

Relative Importance:

12345

Strength of Evidence:

12000



17:2 Ensure Usable Search Results

Guideline: Ensure that the results of user searches provide the precise information being sought, and in a format that matches users' expectations.

Comments: Users want to be able to use the results of a search to continue solving their problem. When users are confused by the search results, or do not immediately find what they are searching for, they become frustrated.

Sources: Amento, et al., 1999; Dumais, Cutrell and Chen, 2001; Nielsen, 2001a; Nielsen, et al., 2000; Pollock and Hockley, 1996; Rosenfeld and Morville, 2002; Spool, et al., 1997.

Example: Returned search results in the main panel contain snippets of the searched page with the user's search terms highlighted (allowing the user to gain a sense of the context in which the terms are used) and a clustered list of related search terms is contained in the left panel.

Relative Importance:

12345

Strength of Evidence:

12340

These search results are difficult to use. There is no discernable order and no ability to sort results by characteristics (e.g., price, size, etc.)

See page xxi for detailed descriptions of the rating scales

12340

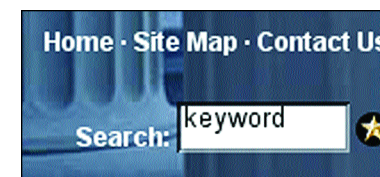
17:3 Allow Simple Searches

Guideline: Structure the search engine to accommodate users who enter one or two keywords.

Comments: The search function should be easy to use. Most users tend to employ simple search strategies, and will use few search terms and even fewer search features (e.g., Boolean operators, query modifiers). If most users are inexperienced Web searchers, provide simple instructions and examples to help guide users' searches.

Sources: Bayles and Bernard, 1999; Koyani and Nall, 1999; Nielsen, 2001a; Nielsen, et al., 2000; Pollock and Hockley, 1996; Spink, Bateman and Jansen 1999; Spool, Schroeder and Ojakaar, 2001b.

Example:



Simple search engines will accommodate most users' search strategies.

This search page is far too complex for the average user. Such advanced search capabilities are best presented on a page dedicated to advanced searches.

Relative Importance:

12345

Strength of Evidence:

12340

17:4 Make Upper- and Lowercase Search Terms Equivalent

Guideline: Treat user-entered upper- and lowercase letters as equivalent when entered as search terms.

Comments: For example, "STRING," "String," and "string" should be recognized and accepted equally by the website. When searching, users will generally be indifferent to any distinction between upper- and lowercase. The site should not compel a distinction that users do not care or know about, or that the user may find difficult to make. In situations when case actually is important, allow users to specify case as a selectable option in the string search.

Sources: Smith and Mosier, 1986.

Relative Importance:

12340

Strength of Evidence:

12000

17:5 Design Search Engines to Search the Entire Site

Guideline: Design search engines to search the entire site, or clearly communicate which part of the site will be searched.

Comments: Designers may want to allow users to control the range of their searches. However, users tend to believe that a search engine will search the entire website. Do not have search engines search only a portion of the site without clearly informing users which parts of the site are being searched.

Keep in mind that what a designer may consider to be the entirety of a site may not be the same as what the user thinks is the "whole" site. For example, many large sites have various subsections that are maintained by different designers, so the user may think of a site as something that designers think of as several sites. Bottom line—make sure it is clear to users what part(s) of the website are being searched.

Sources: Spool, et al., 1997.

Relative Importance:

12340

Strength of Evidence:

10000

Example:

This design allows users to easily bound their search to a selected subsection of the website, or to run an unbounded search by selecting the "All of SSA" menu choice.

17:6 Design Search Around Users' Terms

Guideline: Construct a website's search engine to respond to users' terminology.

Comments: Users seem to rely on certain preferred words when searching. Determining the appropriate keywords may require considerable data collection from users. Designers should research the most preferred search words for their site, and make information relevant to those terms easy to find through the site's search engine. Remember that designers' keywords may not match users' keywords, and content writers may overestimate the specialized vocabulary of their audience.

Sources: Dumais, Cutrell and Chen, 2001; Egan, Remde, Landauer, et al., 1989; Evans, 1998; Hooke, DeLeo and Slaughter, 1979; Koyani and Nall, 1999; Schiano, Stone and Bectarte, 2001; Spyridakis, 2000.

Relative Importance:

12340

Strength of Evidence:

12340

17:7 Notify Users When Multiple Search Options Exist

Guideline: If more than one type of search option is provided, ensure that users are aware of all the different types of search options and how each is best used.

Comments: Most users assume that a website has only one type of search. In one study, when there were multiple search types available, users tended to miss some of the search capabilities.

Sources: Bailey, Koyani and Nall, 2000; Levy, et al., 1996.

Example:

See page xxi
for detailed descriptions
of the rating scales

12340

17:8 Provide Search Templates

Guideline: Provide templates to facilitate the use of search engines.

Comments: Search templates assist users in formulating better search queries. A template consists of predefined keywords that help users select their search terms. The keywords can be used directly, or can help users formulate their own queries. Each template should be organized as a hierarchy of predefined keywords that could help to restrict the users' initial search sets, and improve the relevance of the returned "hits." One study reported that people using templates find seventy percent more target websites than those not using templates.

Sources: Fang and Salvendy, 1999.

Example: Some 'search template' examples include:

To find information on 'human error' use
 errors fault miscalculation
 slips blunder slip-up
 mistakes inaccuracy

To find information on 'usability testing' use
 user interface testing cognitive walkthroughs
 performance testing automatic tests
 heuristics evaluations remote testing

To get more specific search results, try using the following tips:

Check [spelling](#)

Use [multiple words](#)

Example: our free product

Use [similar words](#)

Example: safe secure privacy security

Use appropriate [capitalization](#)

Example: Search Template Reference

Use [quotation marks](#)

Example: "our pledge to you"

Use [plus \(+\) or minus \(-\)](#)

Example: +"template language"

Relative Importance:

12000

Strength of Evidence:

12300

Glossary

Above the fold

The region of a Web page that is visible without scrolling. The area above the fold will vary according to a user's monitor size and their resolution settings. The region above the fold is called a screenful.

Active voice

Active voice makes subjects do something (to something). For example, in "John caught the ball," the verb "caught" is in the active voice: John did to the ball what the verb caught expresses.

Anchor links

Anchor links can be used on content pages that contain several (usually three or more) screenfuls of information. Anchor links allow users to skip through textual information, resulting in a more efficient information-finding process. Anchor links are best arranged as a table of contents for the page. See also 'Within-page links.'

Applet

A mini- or software program that a Java- or ActiveX-enabled browser downloads and uses automatically.

Assistive technologies

Technologies (software or hardware) that increase, maintain, or improve the functional capabilities of individuals with disabilities when interacting with computers or computer-based systems.

Auto-tabbing

A website feature whereby the data entry cursor automatically moves from one entry field to the next as a user enters a pre-determined number of characters. For instance, when entering phone number data in three separate entry fields of three digits—three digits—four digits, the data entry cursor would auto-tab from the first field to the second field

once the user has entered three digits, and again from the second field to the third field once the user has entered another three digits.

Banner

Banners are graphic images that commonly function as Web-based billboards. Banner ads generally appear toward the top-center of the screen, and are used as attention-grabbing links to other sites.

Breadcrumbs

Breadcrumbs are a navigation element that allows users to orient themselves within a website, or efficiently move to one of the intermediate pages. Breadcrumbs are usually placed near the top of the page (generally immediately beneath the browser's address bar). For example, if users are reading about the features and benefits of "Widget X," breadcrumbs might show the following information:

Home > Products > Widget X > Features/Benefits.

Breadcrumbs allow users to find their way to the homepage and ensure that they won't easily become lost. Breadcrumbs should be designed so that users can click on any of the words in the breadcrumb string to jump to that section of the website.

Card Sorting

A method used to identify categories that are inherent in a set of items. The goal of card sorting is to understand how a typical user views a given set of items. Card sorting is usually done by writing items on individual paper cards, and then asking users to group together similar cards.

The grouping information from all card sorters is then combined and analyzed using cluster analysis software.

Cascading menu

A menu structure where submenus open when the user selects a choice from a menu. Cascading menus are particularly useful in hierarchically-complex websites.

Check box

A control element that a user can click to turn an option on or off. When the option is on, an "X" or " " appears in the box. Check boxes are conventionally used when users may select one or more items from a list of items.

Clickability cues

A visual indication that a given word or item on a Web page is clickable. Cues that can be used to indicate the clickability of an item include color, underlining, bullets, and arrows.

Client-side

Occurring on the client side of a client-server system. JavaScript scripts are client-side because they are executed by the user's browser (the client). In contrast, CGI scripts are server-side because they run on the Web server.

Cognitive walkthrough

An inspection method for evaluating the design of a user interface, with special attention to how well the interface supports "exploratory learning," i.e., first-time use without formal training. The evaluation is done by having a group of evaluators go step-by-step through commonly used tasks. It can be performed by evaluators in the early stages of design, before performance testing is possible.

Connection speed

The maximum rate at which Web pages are downloaded to a user's computer. Connection speed is often quoted in bps (bits per second). Common connection speeds include dial-up (modem) at 28,800 to 56,000 bps, DSL/cable at approximately 500,000 bps, and T1 at up to 1,500,000 bps.

Content page

A Web page designed to convey specific information to a user. Content pages are often found two or three clicks deep within a website. The defining characteristic of a content page is a reliance on text, graphics, and pictures that are designed to convey information on a given subject to users.

Continuous text

In a Web context, continuous text comprises sentences and paragraphs. See also 'Prose text.'

Data entry field

A visually well-defined location on a page where users may enter data.

Density, page

A measure of the percent of the screen that is filled with text and graphics.

Destination page

The location in a website where a given user goes after clicking on a link. See also 'Target page.'

Download time

The amount of time required for a requested page to fully appear on a user's screen.

Drop-down list

Drop-down lists are screen-based controls in which one list item shows, and the remaining list items are hidden until users click on a downward-facing arrow. Drop-down lists allow designers to preserve screen real estate while maintaining the ability to present a full suite of options to users.

Embedded link

A link that is found in the middle of prose or continuous text. Embedded links are often used to provide users with the definitions of terms or to lead them to supporting or related information.

Entry field

The entry field, which is also known as a data or text entry field, is employed

when users are required to make text or data entries, including keywords, commands, quantities, etc.

Expert evaluation or Expert review
See 'Heuristic evaluation.'**Fold**

The fold is defined as the lowest point where a Web page is no longer visible on a computer monitor or screen. Where on a Web page the fold falls is a function of the monitor size, the screen resolution, and the font size selection. The information that is visible when a Web page first loads is considered to be 'above the fold.' Those regions of the same Web page that are visible only by scrolling are considered to be 'below the fold.'

Frame

A feature supported by most browsers that enables the designer to divide the display area into two or more sections (frames). The contents of each frame behave like different Web pages.

Gloss

An automated action that provides summary information on where a link will take a user prior to the user clicking on the link. Often, glosses appear as a small 'pop-up' text box adjacent to a link. The gloss appears as the user moves the mouse over the link that is programmed with the gloss.

Heading

The title, subtitle, or topic that stands at the top or beginning of a paragraph or section of text.

Heuristic evaluation

An inspection method for finding certain types of usability problems in a user interface design. Heuristic evaluation involves having one or more usability specialists individually examine the interface and judge its compliance with recognized usability principles. These usability principles are the "heuristics" from which the method takes its name.

Image map

A graphic designed to assist users' navigation of a website. Regions of the graphic are designed to be clickable.

Index link

Index links function as a table of contents—they provide users a quick glance at the website organization, allows users to quickly ascertain where they want to go, and to navigate there directly from the homepage.

Keyword

A word that is used as a reference point for finding other words or information using a search capability in a website.

Masthead

The (usually) graphical banner at the top of a Web page that identifies the organization or group that hosts the website. The masthead typically contains the name of the organization and site (if different) and an organizational logo.

Minesweeping

An action designed to identify where on a page links are located. Minesweeping involves the user rapidly moving the cursor or pointer over a page, watching to see where the cursor or pointer changes to indicate the presence of a link. See also 'Mouseover.'

Mouseover

A Web interaction wherein some visually-apparent change occurs to an item when the user's cursor/pointer is placed over the item. Examples of visually-apparent change includes links highlighting (words, images, etc.), cursors/pointers changing shape, or menus opening. See also 'Minesweeping.'

Navigation page

A Web page that contains no content and that is designed solely to direct or redirect users. Navigation pages may be designed as homepages, site maps, site overviews, etc.

Open list

An open list is a screen-based control where either all of the list items are immediately visible on the screen, or where several list items are immediately visible to the user, and the remaining list items can be viewed by scrolling the list.

Page title

Page titles refer to the text located in the browser title bar (this is the bar found at the very top of the screen of common browsers).

Paging

A website design methodology that requires users to follow a series of "Next page" links to read an entire article. Moving from page-to-page is an alternative to scrolling through long pages.

Panels

Visually and thematically-defined sections of a Web page. Panels are frequently placed in the left and right margins of pages. Panels often contain navigation aids, including related links. Content is not usually placed in left or right panels.

Passive voice

Voice is a grammatical feature of English verbs. Passive voice permits subjects to have something done to them (by someone or something). For example, "The ball was caught by John." Some argue that passive voice is more indirect and wordier than active voice.

Path

The route taken by a user as they move through a website. The path can be shown by breadcrumbs.

Performance objectives

The goals set for user behaviors on an individual Web page or a series of Web pages. These objectives usually are stated in terms of the time to correctly

select a link, the overall accuracy of selecting links, the average time to select a target page, etc.

Performance test

A usability test that is characterized by having typical users perform a series of tasks where their speed, accuracy and success are closely monitored and measured.

Physical consistency

Physical consistency refers to the "look and feel" of a website. Physically consistent Web pages will have logos, headers, and navigation elements all located in the same place. The pages also will use the same fonts and graphic elements across all pages in the site.

Plug-in

A software module that adds a specific feature or service to a larger system. For example, there are a number of plug-ins for common browsers that enable them to display different types of audio and video.

Point-and-click

A term used to describe conventional Web surfing behavior. When a user visually identifies a link they wish to follow, they place their mouse pointer over the link (point) and depress the appropriate button on the mouse (click). See also 'Mouseover.'

Pop-under/Pop-up

A pop-under or pop-up is a window that is automatically invoked when a user loads a Web page. Pop-unders appear "below" the active browser window, whereas pop-ups appear "above" the active window and can obscure screen contents.

Preference objectives

The goals set for user attitudes toward individual Web pages or an entire website. The objectives are usually set and measured using questionnaires. These objectives include information concerning user acceptance and user satisfaction.

Prose text

Ordinary writing. In a Web context, prose text comprises sentences and paragraphs. See also 'Continuous text.'

Pushbutton

Pushbuttons are screen-based controls that contain a text label or an image (or both). Pushbuttons are used to provide quick and convenient access to frequently-used actions. The pushbutton control is always activated with a single click of a mouse button. Clicking on pushbuttons should cause the indicated action to take place, i.e., "Search." Do not use pushbuttons to move from one location to another in a website.

Radio button

A screen-based control used to select one item from a list of mutually-exclusive items (i.e., use radio buttons when only one item in a list of several items can be selected).

Reveals

Information that automatically appears on the screen during a Web-based slideshow presentation, or while viewing a multimedia Web page.

Scanning

An information-retrieval method whereby users look quickly through a Web page looking for target information (headers, keywords, etc.). Scanning can be a quick and efficient information-retrieval method if Web pages are designed to accommodate scanning.

Screen reader

A software program used to allow reading of content and navigation of the screen using speech or Braille output. Used primarily by people who have difficulty seeing.

Screenful

A screenful is defined as that portion of a Web page that is visible on any given user's monitor or screen at any given point in time. The size of the screenful is

determined by the user's monitor size, screen resolution settings, and the user's selected font size.

Scroll bar

The scroll bar is visible along the right edge of common browsers. It is defined by a movable box that runs on a vertical or horizontal axis.

Scroll stopper

A graphic or other page element that may visually impede a user from scrolling to the true top or bottom of a page. Misplaced headers, horizontal lines, or sections of text in very small fonts may act as scroll stoppers.

Scrolling

A method of traversing a Web page wherein users either roll the scroll wheel on their mouse, or manually move the scroll bar located on the right side of their browser's screen.

Section 508

Section 508 of the Rehabilitation Act was enacted to eliminate barriers in information technology, to make available new opportunities for people with disabilities, and to encourage development of technologies that will help achieve these goals. The law applies to all Federal agencies when they develop, procure, maintain, or use electronic and information technology. Under Section 508 (29 U.S.C. § 794d), agencies must give disabled employees and members of the public access to information that is comparable to the access available to others.

Sequential menus

Menus that involve multiple choices that must be made in some predetermined order, with the impact of a given choice constrained by the sum total of all previous choices.

Server-side (image map)

Occurring on the server side of a client-server system. For example, on the Web, CGI scripts are server-side applications because they run on the Web server. In contrast, JavaScript scripts are client-side because they are executed by the browser (the client). Java applets can be either server-side or client-side depending on which computer (the server or the client) executes them.

Simultaneous menus

Menus that simultaneously display choices from multiple levels in the menu hierarchy, providing users with the ability to make menu choices in any order.

Site map

A clickable, graphic- or text-based display of a website's hierarchy.

Style sheet

A set of statements that specify presentation of a document. Style sheets may have three different origins: they may be written by content providers, created by users, or built into browsers or plug-ins.

Tab

A graphical navigation element that is most often placed at the top of a Web page. Effective tabs should be designed so that they resemble real-world file folder tabs.

Tagline

A phrase or short sentence placed directly below a Web page's masthead. The tagline functions to quickly identify the purpose of the website. It may be a subtitle, an organizational motto, or a vision or purpose statement.

Target page

The location in a site where a user will find the information they are seeking. See also 'Destination page.'

Task analysis

A method used to identify and

understand the activities to be performed by users when interacting with a website.

Thumbnail image

A small copy of a larger image.

Time out

When entering data that may be sensitive (e.g., credit card or social security numbers), many websites will disconnect ('time out') if a user has not interacted with the browser in a set amount of time.

URL

URL is an abbreviation for Uniform Resource Locator. Every Web page has a URL that is used to identify the page and the server on which the page resides.

Usability testing

Usability testing includes a range of test and evaluation methods that include automated evaluations, inspection evaluations, operational evaluations and human performance testing. In a typical performance test, users perform a variety of tasks with a prototype (or an operational system) while observers note what each user does and says while performance data are recorded. One of the main purposes of usability testing is to identify issues that keep users from meeting the usability goals of a website.

Widget

Screen-based controls that are used to interact with a website and other systems. Widgets include pushbuttons, selection lists, radio buttons, sliders, etc.

Within-page links

Within-page links are used on content pages that contain several (e.g., three or more) screenfuls of information. Within-page links are best arranged as a table of contents for the page. Within-page links allow users to skip through textual information, resulting in a more efficient information-finding process. See also 'Anchor links.'

Appendices

Guidelines Ranked by Relative Importance*

Chapter: Guideline #	Guideline Heading	Relative Importance
1:1	Set and State Goals	5
1:2	Use an Iterative Design Approach	5
1:3	Evaluate Websites Before and After Making Changes	5
1:4	Provide Useful Content	5
2:1	Display Information in a Directly Usable Format	5
2:2	Do Not Display Unsolicited Windows or Graphics	5
3:4	Do Not Use Color Alone to Convey Information	5
4:1	Design for Common Browsers	5
5:1	Create a Positive First Impression of Your Site	5
5:2	Ensure the Homepage Looks like a Homepage	5
5:3	Show All Major Options on the Homepage	5
7:1	Provide Feedback on Users' Location	5
8:1	Eliminate Horizontal Scrolling	5
9:1	Use Clear Category Labels	5
9:2	Use Unique and Descriptive Headings	5
10:1	Provide Consistent Clickability Cues	5
11:1	Use Black Text on Plain, High-Contrast Backgrounds	5
11:2	Ensure Visual Consistency	5
13:1	Distinguish Required and Optional Data Entry Fields	5
13:2	Detect Errors Automatically	5
13:3	Minimize User Data Entry	5
13:4	Label Data Entry Fields Clearly	5
13:5	Put Labels Close to Data Entry Fields	5
16:1	Organize Information Clearly	5
16:2	Put Critical Information Near the Top of the Website	5
17:1	Provide a Search Option on Each Page	5
17:2	Ensure Usable Search Results	5
17:3	Allow Simple Searches	5
1:5	Understand and Meet Users' Expectations	4
1:6	Establish User Requirements	4
1:7	Use Parallel Design	4
1:8	Consider Many User Interface Issues	4
1:9	Focus on Performance Before Preference	4
1:10	Set Usability Goals	4
1:11	Select the Right Number of Participants	4
1:12	Be Easily Found on the Web	4
2:3	Provide Assistance to Users	4
2:4	Provide Printing Options	4

* Within each scale, the guidelines are listed in the order they appear in the chapters. See page xx for an explanation of the Relative Importance scale.

Guidelines Ranked by Relative Importance

Chapter: Guideline #	Guideline Heading	Relative Importance
2:5	Standardize Task Sequences	4
2:6	Minimize Page Download Time	4
2:7	Warn of 'Time Outs'	4
3:2	Design Forms for Users Using Assistive Technology	4
3:3	Provide Text Equivalents for Non-Text Elements	4
4:2	Account for Browser Differences	4
4:3	Design for Popular Operating Systems	4
4:4	Design for User's Typical Connection Speed	4
5:4	Enable Access to the Homepage	4
5:5	Attend to Homepage Panel Width	4
5:6	Announce Changes to a Website	4
6:1	Set Appropriate Page Lengths	4
6:2	Use Frames When Functions Must Remain Accessible	4
6:3	Establish Level of Importance	4
7:2	Use a Clickable 'List of Contents' on Long Pages	4
7:3	Do Not Create Pages with No Navigational Options	4
7:4	Differentiate and Group Navigation Elements	4
7:5	Use Descriptive Tab Labels	4
10:2	Avoid Misleading Cues to Click	4
10:3	Use Text for Links	4
10:4	Use Meaningful Link Labels	4
10:5	Match Link Names With Their Destination Pages	4
10:6	Ensure that Embedded Links are Descriptive	4
10:7	Repeat Important Links	4
10:8	Designate Used Links	4
10:9	Link to Related Content	4
11:3	Format Common Items Consistently	4
11:4	Use at Least 12-Point Font	4
12:1	Order Elements to Maximize User Performance	4
12:2	Display Related Items in Lists	4
12:3	Introduce Each List	4
12:4	Format Lists to Ease Scanning	4
12:5	Start Numbered Items at One	4
13:6	Label Pushbuttons Clearly	4
13:7	Label Data Entry Fields Consistently	4
13:8	Allow Users to See Their Entered Data	4
13:9	Display Default Values	4
13:10	Use a Minimum of Two Radio Buttons	4
14:1	Use Video, Animation, and Audio Meaningfully	4
14:2	Include Logos	4

Guidelines Ranked by Relative Importance

Chapter: Guideline #	Guideline Heading	Relative Importance
14:3	Limit Large Images Above the Fold	4
15:1	Define Acronyms and Abbreviations	4
15:2	Use Abbreviations Sparingly	4
15:3	Use Familiar Words	4
15:4	Use Mixed Case with Prose	4
15:5	Avoid Jargon	4
16:3	Facilitate Scanning	4
16:4	Group Related Elements	4
16:5	Display Only Necessary Information	4
16:6	Ensure that All Necessary Information is Displayed	4
16:7	Format Information for Multiple Audiences	4
17:4	Make Upper- and Lowercase Search Terms Equivalent	4
17:5	Design Search Engines to Search the Entire Site	4
17:6	Design Search Around Users' Terms	4
1:13	Recognize Tester Bias	3
2:8	Reduce the User's Workload	3
2:9	Use Users' Terminology in Help Documentation	3
2:10	Provide Feedback When Users Must Wait	3
2:11	Inform Users of Long Download Times	3
2:12	Do Not Require Users to Multitask While Reading	3
2:13	Design For Working Memory Limitations	3
3:1	Comply with Section 508	3
3:5	Provide Equivalent Pages	3
3:6	Ensure that Scripts Allow Accessibility	3
3:7	Provide Client-Side Image Maps	3
3:8	Enable Users to Skip Repetitive Navigation Links	3
3:9	Provide Frame Titles	3
3:10	Test Plug-ins and Applets for Accessibility	3
5:7	Communicate the Website's Purpose	3
6:4	Place Important Items at Top Center	3
6:5	Place Important Items Consistently	3
6:6	Structure for Easy Comparison	3
6:7	Use Moderate White Space	3
6:8	Align Items on a Page	3
7:6	Present Tabs Effectively	3
7:7	Use Site Maps	3
7:8	Use Appropriate Menu Types	3
8:2	Use Scrolling Pages For Reading Comprehension	3
9:3	Use Descriptive Row and Column Headings	3
9:4	Use Descriptive Headings Liberally	3

Guidelines Ranked by Relative Importance

Chapter: Guideline #	Guideline Heading	Relative Importance
9:5	Provide Descriptive Page Titles	3
9:6	Highlight Critical Data	3
10:10	Link to Supportive Information	3
10:11	Use Appropriate Text Link Lengths	3
10:12	Indicate Internal vs. External Links	3
10:13	Use 'Pointing-and-clicking'	3
10:14	Clarify Clickable Regions of Images	3
11:5	Use Familiar Fonts	3
11:6	Emphasize Importance	3
12:6	Place Important Items at Top of the List	3
13:11	Use Radio Buttons for Mutually Exclusive Selections	3
13:12	Use Check Boxes to Enable Multiple Selections	3
13:13	Use Familiar Widgets	3
13:14	Use a Single Data Entry Method	3
13:15	Partition Long Data Items	3
13:16	Do Not Make User-Entered Codes Case Sensitive	3
13:17	Place Cursor in First Data Entry Field	3
13:18	Provide Auto-tabbing Functionality	3
13:19	Label Units of Measurement	3
13:20	Ensure that Double-Clicking Will Not Cause Problems	3
14:4	Limit the Use of Images	3
14:5	Label Clickable Images	3
14:6	Ensure that Images Do Not Slow Downloads	3
14:7	Use Thumbnail Images to Preview Larger Images	3
14:8	Graphics Should Not Look Like Banner Ads	3
14:9	Use Simple Background Images	3
14:10	Include Actual Data with Data Graphics	3
15:6	Make First Sentences Descriptive	3
15:7	Use Active Voice	3
15:8	Write Instructions in the Affirmative	3
15:9	Limit the Number of Words and Sentences	3
15:10	Limit Prose Text on Navigation Pages	3
16:8	Design Quantitative Content for Quick Understanding	3
17:7	Notify Users When Multiple Search Options Exist	3
1:14	Use Heuristics Cautiously	2
1:15	Use Cognitive Walkthroughs Cautiously	2
2:14	Develop Pages that will Print Properly	2
3:11	Synchronize Multimedia Elements	2
3:12	Do Not Require Style Sheets	2
3:13	Avoid Screen Flicker	2

Guidelines Ranked by Relative Importance

Chapter: Guideline #	Guideline Heading	Relative Importance
4:5	Design for Commonly Used Screen Resolutions	2
5:8	Limit Prose Text on the Homepage	2
6:9	Choose Appropriate Line Lengths	2
6:10	Avoid Scroll Stoppers	2
7:9	Keep Navigation-only Pages Short	2
8:3	Use Paging Rather Than Scrolling	2
8:4	Scroll Fewer Screenfuls	2
9:7	Provide Users with Good Ways to Reduce Options	2
11:7	Use Attention-Attracting Features when Appropriate	2
13:21	Do Not Limit Viewable List Box Options	2
13:22	Use Open Lists to Select One from Among Many	2
13:23	Prioritize Pushbuttons	2
14:11	Display Monitoring Information Graphically	2
14:12	Introduce Animation	2
14:13	Ensure Website Images Convey Intended Messages	2
15:11	Make Action Sequences Clear	2
16:9	Use Color for Grouping	2
17:8	Provide Search Templates	2
1:16	Apply Automatic Evaluation Methods	1
5:9	Limit Homepage Length	1
7:10	Use 'Glosses' to Assist Navigation	1
8:5	Facilitate Rapid Scrolling	1
9:8	Use Headings in the Appropriate HTML Order	1
12:7	Capitalize First Letter of First Word in Lists	1
12:8	Use Appropriate List Style	1
13:24	Minimize Use of the Shift Key	1
13:25	Use Data Entry Fields to Speed Performance	1
14:14	Use Images to Facilitate Learning	1
14:15	Emulate Real-World Objects	1

Appendices

Guidelines Ranked by Strength of Evidence*

Chapter: Guideline #	Guideline Heading	Strength of Evidence
1:2	Use an Iterative Design Approach	5
1:4	Provide Useful Content	5
1:13	Recognize Tester Bias	5
1:14	Use Heuristics Cautiously	5
1:15	Use Cognitive Walkthroughs Cautiously	5
2:5	Standardize Task Sequences	5
2:13	Design For Working Memory Limitations	5
6:8	Align Items on a Page	5
6:9	Choose Appropriate Line Lengths	5
9:4	Use Descriptive Headings Liberally	5
11:1	Use Black Text on Plain, High-Contrast Backgrounds	5
11:2	Ensure Visual Consistency	5
11:4	Use at Least 12-Point Font	5
11:5	Use Familiar Fonts	5
11:6	Emphasize Importance	5
11:7	Use Attention-Attracting Features when Appropriate	5
12:1	Order Elements to Maximize User Performance	5
13:25	Use Data Entry Fields to Speed Performance	5
14:1	Use Video, Animation, and Audio Meaningfully	5
14:6	Ensure that Images Do Not Slow Downloads	5
14:9	Use Simple Background Images	5
14:14	Use Images to Facilitate Learning	5
15:4	Use Mixed Case with Prose	5
16:3	Facilitate Scanning	5
16:4	Group Related Elements	5
16:8	Design Quantitative Content for Quick Understanding	5
16:9	Use Color for Grouping	5
1:6	Establish User Requirements	4
1:7	Use Parallel Design	4
1:11	Select the Right Number of Participants	4
1:12	Be Easily Found on the Web	4
2:6	Minimize Page Download Time	4
2:10	Provide Feedback When Users Must Wait	4
2:12	Do Not Require Users to Multitask While Reading	4
3:4	Do Not Use Color Alone to Convey Information	4
5:1	Create a Positive First Impression of Your Site	4
5:2	Ensure the Homepage Looks like a Homepage	4
6:2	Use Frames When Functions Must Remain Accessible	4

* Within each scale, the guidelines are listed in the order they appear in the chapters.
See page xxi for an explanation of the Strength of Evidence scale.

Guidelines Ranked by Strength of Evidence

Chapter: Guideline #	Guideline Heading	Strength of Evidence
6:3	Establish Level of Importance	4
6:4	Place Important Items at Top Center	4
6:5	Place Important Items Consistently	4
6:6	Structure for Easy Comparison	4
6:7	Use Moderate White Space	4
6:10	Avoid Scroll Stoppers	4
7:4	Differentiate and Group Navigation Elements	4
7:7	Use Site Maps	4
7:8	Use Appropriate Menu Types	4
7:9	Keep Navigation-only Pages Short	4
8:1	Eliminate Horizontal Scrolling	4
8:2	Use Scrolling Pages For Reading Comprehension	4
8:3	Use Paging Rather Than Scrolling	4
9:1	Use Clear Category Labels	4
10:1	Provide Consistent Clickability Cues	4
10:3	Use Text for Links	4
10:4	Use Meaningful Link Labels	4
10:5	Match Link Names With Their Destination Pages	4
10:6	Ensure that Embedded Links are Descriptive	4
10:7	Repeat Important Links	4
12:2	Display Related Items in Lists	4
12:3	Introduce Each List	4
12:4	Format Lists to Ease Scanning	4
12:6	Place Important Items at Top of the List	4
12:8	Use Appropriate List Style	4
13:11	Use Radio Buttons for Mutually Exclusive Selections	4
13:14	Use a Single Data Entry Method	4
13:24	Minimize Use of the Shift Key	4
14:2	Include Logos	4
14:5	Label Clickable Images	4
14:8	Graphics Should Not Look Like Banner Ads	4
14:10	Include Actual Data with Data Graphics	4
14:11	Display Monitoring Information Graphically	4
14:15	Emulate Real-World Objects	4
15:5	Avoid Jargon	4
15:6	Make First Sentences Descriptive	4
15:7	Use Active Voice	4
15:9	Limit the Number of Words and Sentences	4
15:11	Make Action Sequences Clear	4
16:1	Organize Information Clearly	4

Guidelines Ranked by Strength of Evidence

Chapter: Guideline #	Guideline Heading	Strength of Evidence
16:5	Display Only Necessary Information	4
17:2	Ensure Usable Search Results	4
17:3	Allow Simple Searches	4
17:6	Design Search Around Users' Terms	4
1:3	Evaluate Websites Before and After Making Changes	3
1:8	Consider Many User Interface Issues	3
1:9	Focus on Performance Before Preference	3
1:10	Set Usability Goals	3
1:16	Apply Automatic Evaluation Methods	3
2:1	Display Information in a Directly Usable Format	3
2:2	Do Not Display Unsolicited Windows or Graphics	3
2:3	Provide Assistance to Users	3
2:7	Warn of 'Time Outs'	3
2:8	Reduce the User's Workload	3
2:9	Use Users' Terminology in Help Documentation	3
2:11	Inform Users of Long Download Times	3
3:7	Provide Client-Side Image Maps	3
5:4	Enable Access to the Homepage	3
5:5	Attend to Homepage Panel Width	3
5:8	Limit Prose Text on the Homepage	3
6:1	Set Appropriate Page Lengths	3
7:2	Use a Clickable 'List of Contents' on Long Pages	3
7:5	Use Descriptive Tab Labels	3
7:6	Present Tabs Effectively	3
8:5	Facilitate Rapid Scrolling	3
9:2	Use Unique and Descriptive Headings	3
9:3	Use Descriptive Row and Column Headings	3
9:6	Highlight Critical Data	3
10:11	Use Appropriate Text Link Lengths	3
10:13	Use 'Pointing-and-clicking'	3
10:14	Clarify Clickable Regions of Images	3
13:1	Distinguish Required and Optional Data Entry Fields	3
13:2	Detect Errors Automatically	3
13:3	Minimize User Data Entry	3
13:4	Label Data Entry Fields Clearly	3
13:7	Label Data Entry Fields Consistently	3
13:8	Allow Users to See Their Entered Data	3
13:12	Use Check Boxes to Enable Multiple Selections	3
13:13	Use Familiar Widgets	3
13:18	Provide Auto-tabbing Functionality	3

Guidelines Ranked by Strength of Evidence

Chapter: Guideline #	Guideline Heading	Strength of Evidence
13:19	Label Units of Measurement	3
13:21	Do Not Limit Viewable List Box Options	3
14:3	Limit Large Images Above the Fold	3
14:4	Limit the Use of Images	3
14:12	Introduce Animation	3
14:13	Ensure Website Images Convey Intended Messages	3
15:3	Use Familiar Words	3
15:10	Limit Prose Text on Navigation Pages	3
16:2	Put Critical Information Near the Top of the Website	3
16:7	Format Information for Multiple Audiences	3
17:7	Notify Users When Multiple Search Options Exist	3
17:8	Provide Search Templates	3
1:1	Set and State Goals	2
1:5	Understand and Meet Users' Expectations	2
2:4	Provide Printing Options	2
2:14	Develop Pages that will Print Properly	2
3:1	Comply with Section 508	2
3:2	Design Forms for Users Using Assistive Technology	2
3:3	Provide Text Equivalents for Non-Text Elements	2
3:5	Provide Equivalent Pages	2
3:6	Ensure that Scripts Allow Accessibility	2
3:8	Enable Users to Skip Repetitive Navigation Links	2
3:9	Provide Frame Titles	2
3:10	Test Plug-ins and Applets for Accessibility	2
3:11	Synchronize Multimedia Elements	2
4:1	Design for Common Browsers	2
4:2	Account for Browser Differences	2
4:3	Design for Popular Operating Systems	2
4:4	Design for User's Typical Connection Speed	2
4:5	Design for Commonly Used Screen Resolutions	2
5:3	Show All Major Options on the Homepage	2
5:6	Announce Changes to a Website	2
5:7	Communicate the Website's Purpose	2
5:9	Limit Homepage Length	2
7:1	Provide Feedback on Users' Location	2
7:3	Do Not Create Pages with No Navigational Options	2
7:10	Use 'Glosses' to Assist Navigation	2
8:4	Scroll Fewer Screenfuls	2
9:5	Provide Descriptive Page Titles	2
9:7	Provide Users with Good Ways to Reduce Options	2

Guidelines Ranked by Strength of Evidence

Chapter: Guideline #	Guideline Heading	Strength of Evidence
9:8	Use Headings in the Appropriate HTML Order	2
10:2	Avoid Misleading Cues to Click	2
10:8	Designate Used Links	2
10:9	Link to Related Content	2
10:10	Link to Supportive Information	2
10:12	Indicate Internal vs. External Links	2
11:3	Format Common Items Consistently	2
12:5	Start Numbered Items at One	2
12:7	Capitalize First Letter of First Word in Lists	2
13:5	Put Labels Close to Data Entry Fields	2
13:6	Label Pushbuttons Clearly	2
13:9	Display Default Values	2
13:10	Use a Minimum of Two Radio Buttons	2
13:15	Partition Long Data Items	2
13:16	Do Not Make User-Entered Codes Case Sensitive	2
13:17	Place Cursor in First Data Entry Field	2
13:20	Ensure that Double-Clicking Will Not Cause Problems	2
13:22	Use Open Lists to Select One from Among Many	2
13:23	Prioritize Pushbuttons	2
14:7	Use Thumbnail Images to Preview Larger Images	2
15:1	Define Acronyms and Abbreviations	2
15:2	Use Abbreviations Sparingly	2
15:8	Write Instructions in the Affirmative	2
16:6	Ensure that All Necessary Information is Displayed	2
17:1	Provide a Search Option on Each Page	2
17:4	Make Upper- and Lowercase Search Terms Equivalent	2
3:12	Do Not Require Style Sheets	1
3:13	Avoid Screen Flicker	1
17:5	Design Search Engines to Search the Entire Site	1

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Author Index

- Ackerman, M.S., 13, 23, 192
 Adamson, P.J., 97, 187
 Adkisson, H.P., 5, 97, 131, 187
 Ahlstrom, V., 12, 20, 21, 28, 77, 98, 118, 124, 125, 145, 146, 158, 187
 Ahmadi, M., 13, 136, 141, 143, 187
 Ahumada, A.J., 96, 205
 Akerelrea, C.A., 155, 210
 Alfaro, L., 194
 Allard, A., 47, 54, 101, 103, 104, 106, 158, 163, 202
 Allen, R.W., 9, 188
 Allinson, L., 60, 187
 Amento, B., 8, 35, 166, 187
 Anderson, J.R., 48, 49, 107, 190
 Asher, S.R., 3, 187
 Ashworth, C.A., 46, 62, 187
 Atwood, M.E., 10, 192
 Ausubel, D.D., 52, 187
 Baca, B., 6, 187
 Baddeley, A., 20, 187
 Badre, A.N., 2, 3, 43, 49, 60, 97, 133, 136, 187
 Bailey, G.D., 2, 187
 Bailey, R.W., 6, 7, 9, 18, 20, 25, 38, 42, 52, 54, 59, 61, 70, 73, 75, 78, 81, 82, 84, 85, 86, 98, 108, 111, 112, 116, 117, 118, 119, 120, 121, 126, 127, 128, 129, 132, 143, 149, 151, 152, 157, 169, 187, 188
 Baker, R., 45, 189
 Baldwin, R.S., 3, 188
 Ball, L.J., 5, 188
 Barber, R.E., 16, 188
 Barbesi, A., 135, 204
 Basalaj, W., 204
 Bateman, J., 8, 167, 206
 Bayles, M.E., 136, 167, 188
 Beaton, R.J., 133, 158, 197, 209
 Bectarte, R., 169, 205
 Beldie, I.P., 64, 68, 205
 Bender, G.T., 135, 206
 Benson, P., 155, 188
 Benway, J.P., 136, 188
 Benyon, D., 6, 195
 Bernard, M.L., 45, 46, 49, 51, 67, 86, 87, 98, 99, 106, 167, 188, 189, 191
 Bevan, N., 200
 Bhatti, N., 16, 18, 135, 189
 Bieber, M., 57, 189
 Biers, D.W., 5, 9, 191, 199
 Billingsley, P.A., 62, 189
 Bilsing, L., 210
 Blackmon, M.H., 10, 189
 Boies, S.J., 194, 195
 Booher, H.R., 134, 189
 Borella, M., 135, 205
 Bouch, A., 16, 18, 135, 189
 Bouma, H., 100, 151, 189
 Bourne, L.E., 150, 203
 Bovair, S., 15, 189, 204
 Boyarski, D., 99, 189
 Boyntoin, R.M., 96, 137, 189
 Boynton, J.L., 98, 99, 208
 Bradley, R.F., 2, 6, 189
 Brajnik, G., 10, 190
 Bransford, J., 74, 103, 105, 190
 Breland, K., 100, 147, 190
 Breland, M.K., 100, 147, 190
 Brinck, T., 5, 7, 190
 Broadbent, D.E., 20, 190
 Brown, C.H., 100, 147, 204
 Brown, J., 20, 190
 Bruce, V., 96, 190
 Bruns, T., 204
 Bryden, K., 198
 Bubb-Lewis, C., 15, 206
 Buller, D.B., 5, 6, 190, 210
 Bush, W.R., 96, 137, 189
 Butler, C., 17, 201
 Butler, S., 200
 Byrne, M.D., 16, 48, 49, 68, 107, 157, 190
 Caird, J.K., 201
 Cakir, A., 158, 190
 Caldwell, B.S., 151, 200
 Campbell, C.S., 19, 68, 101, 131, 190
 Campbell, D.T., 10, 190
 Campbell, L., 204
 Campbell, R., 2, 10, 197
 Card, S.K., 63, 86, 91, 97, 129, 171, 190, 191
 Carmel, E., 5, 197
 Carroll, J.M., 4, 107, 191

Carter, R., 163, 191
 Casner, S.M., 12, 191
 Cassidy, A., 6, 187
 Catani, M.B., 9, 191
 Celsi, R., 3, 191
 Chang, B-W., 210
 Chaparro, B.S., 51, 93, 106, 135, 191, 206
 Chen, A.H., 109, 199
 Chen, C., 131, 132, 191
 Chen, H., 8, 166, 169, 193
 Chervak, S., 151, 191
 Chi, E., 86, 91, 191
 Chignell, M., 132, 142, 194
 Chin, D.N., 7, 191
 Chisholm, W., 24, 25, 27, 28, 74, 191, 192
 Christ, R.E., 163, 192
 Clark, D.G., 150, 151, 210
 Clark, H., 155, 192
 Cline, J.A., 131, 203
 Coble, J.M., 5, 192
 Cockburn, A., 20, 97, 148, 192
 Cockton, G., 9, 192
 Coe, B., 96, 137, 206
 Cole, B.L., 96, 137, 192, 197
 Coles, P., 100, 194
 Coney, M.B., 2, 35, 41, 84, 109, 192
 Cook, L.K., 52, 75, 199
 Cooke, N.J., 103, 195
 Corl, K.G., 135, 199
 Couper, M.P., 100, 192
 Couret, I., 198
 Covi, L.M., 13, 23, 192
 Crow, D.C., 190
 Csapo, K., 142, 203
 Culbertson, H., 204
 Culpepper, J.T., 142, 199
 Curry, M.B., 20, 192
 Curson, I., 200
 Cutrell, E., 8, 166, 169, 193
 Czaja, S.J., 15, 113, 117, 122, 129, 153, 192
 Czerwinski, M., 84, 198
Dahai, L., 207
 Dailey, S.R., 201
 Dalton, J.P., 206
 Davies, S.E., 194
 de Bruijn, O., 20, 192
 DeAngelo, T., 207
 Decker, J.J., 206
 DeLeo, P.J., 169, 196
 Dennis, I., 5, 188
 DeRouvray, C., 100, 192
 Desurvire, H., 10, 192, 196
 Detweiler, M.C., 2, 4, 14, 15, 19, 38, 46, 47, 48, 58, 59, 62, 69, 74, 79, 87, 94, 103, 105, 106, 109, 137, 155, 165, 192
 Devigal, A., 198
 Dewar, R.E., 201
 Dias, P., 62, 192
 DiSciullo, M., 47, 54, 72, 199
 Dixon, P., 155, 192
 Douglass, S., 190
 Draisin, M., 206
 Drake, D., 46, 87, 189
 Drapeau, T., 47, 54, 72, 199
 Drury, C.G., 151, 191
 Duchnick, R.L., 53, 192
 Dumais, S.T., 8, 97, 166, 169, 193, 194, 205
 Dumas, J.S., 2, 7, 9, 193, 204
 Dunkerton, M.C., 203
 Dyck, J.L., 52, 75, 199
 Dye, C., 206
 Dyson, M.C., 53, 193
 Dyson, M.D., 131, 150, 206
Eberhardt, J., 193
 Eberts, R.E., 97, 193
 Echt, K.V., 201
 Ede, M., 200
 Edgar, E., 131, 207
 Edwards, G., 198
 Egan, D.E., 2, 169, 193
 Elgin, P.D., 62, 194
 Elliott, G., 5, 97, 131, 203
 Ellis, R.D., 98, 136, 193
 Engel, S.E., 77, 98, 103, 105, 107, 115, 122, 146, 147, 159, 160, 163, 193
 Engelbeck, G., 15, 204
 Erno, J., 147, 201
 Esperet, E., 52, 193
 Estes, E., 210
 Evans, J., 5, 188

Evans, M., 3, 16, 19, 20, 21, 25, 30, 31, 33, 39, 45, 47, 53, 56, 59, 65, 72, 75, 76, 82, 84, 86, 88, 91, 96, 99, 100, 101, 103, 107, 115, 117, 133, 134, 140, 141, 145, 146, 148, 151, 152, 155, 156, 157, 169, 193
Fahnrich, K.P., 15, 210
 Fakun, D., 126, 193
 Fang, X., 170, 193
 Faraday, P., 48, 100, 101, 107, 131, 140, 158, 193, 194
 Farkas, D.K., 36, 37, 39, 42, 56, 57, 59, 62, 65, 81, 83, 84, 86, 90, 131, 135, 153, 155, 165, 194
 Farkas, J.B., 36, 37, 39, 42, 56, 57, 59, 62, 65, 81, 83, 84, 86, 90, 131, 135, 155, 165, 194
 Farquhar, B.B., 163, 206
 Farrell, S., 202
 Farris, J.S., 62, 194
 Feldman, C., 201
 Felker, D.B., 103, 150, 155, 204
 Fernandez, M., 45, 189
 Fiegel, T., 2, 10, 197
 Fincher-Kiefer, R.H., 209
 Finn, R., 194
 Flores, T., 204
 Flower, L., 75, 103, 150, 157, 194, 207
 Foley, J., 18, 122, 194
 Foltz, P.W., 15, 194
 Forlizzi, J., 189
 Foster, J., 100, 194
 Fowler, S., 52, 108, 111, 116, 117, 118, 119, 120, 127, 128, 129, 194
 Francis, W.N., 147, 198
 Furnas, G.W., 18, 147, 194
Galitz, W.O., 12, 28, 98, 101, 115, 119, 120, 143, 162, 194
 Gergle, D., 5, 190
 Gerhardt-Powals, J., 12, 17, 21, 73, 75, 158, 162, 194
 Goff, R., 195
 Goldman, H., 206
 Goldsmith, E., 96, 194
 Golovchinsky, G., 132, 142, 194
 Gomez, L.M., 2, 193, 194
 Goodman, L., 105, 206
 Gopher, D., 162, 200
 Gould, J.D., 96, 129, 194, 195
 Graham, M., 6, 195
 Grams, E.S., 57, 195
 Granda, R.E., 77, 98, 103, 105, 107, 115, 122, 146, 147, 159, 160, 163, 193
 Gray, W.D., 7, 10, 195
 Green, P., 16, 155, 207
 Green, P.R., 96, 190
 Green, W.S., 9, 205
 Greene, J.M., 150, 195
 Greene, S.L., 129, 195
 Greene, T.R., 209
 Greenough, R.M., 126, 193
 Grose, E., 6, 195
 Grudin, J., 97, 195
 Guo, X., 201
Haas, S.W., 57, 195
 Hackler, T., 189
 Hackman, R.B., 134, 137, 195
 Halgren, S.L., 103, 195
 Hamilton, D.B., 46, 62, 187
 Hammond, N., 60, 187
 Hannafin, M.J., 131, 203
 Hanson, R.H., 139, 195
 Harrison, S.M., 131, 195
 Hart, D.J., 158, 190
 Hartley, J., 75, 195
 Haselgrove, M., 53, 193
 Hassenzahl, M., 10, 195
 Hau, B., 210
 Haubner, P., 163, 195
 Haupt, B., 194
 Haviland, S., 155, 192
 Hayes, J.R., 75, 103, 150, 194
 Hearst, M.A., 10, 36, 54, 75, 87, 196, 206
 Heimendinger, J., 190
 Herriot, P., 150, 195
 Hersh, H., 98, 99, 208
 Hertzum, M., 9, 196
 Hess, R., 25, 196
 Hill, A.L., 96, 205
 Hill, W., 187
 Hillstrom, A.P., 101, 196
 Hirtle, S.C., 62, 197
 Hix, D., 187
 Hochheiser, H., 63, 196
 Hockley, A., 166, 167, 204

Hofer, E., 7, 190
 Holleran, P.A., 10, 196
 Hong, J.I., 2, 196
 Hooke, L.R., 169, 196
 Hoppe, H.U., 15, 210
 Horton, S., 4, 8, 14, 16, 21, 36, 38, 43, 45, 46, 56, 58, 59, 67, 69, 74, 81, 149, 155, 199
 Horton, W., 148, 150, 196
 Hull, S., 46, 86, 87, 188, 189
Isakson, C.S., 107, 196
 Ivory, M.Y., 10, 36, 54, 75, 87, 196, 206
Jacko, J., 135, 205
 Jacobs, I., 24, 25, 27, 28, 74, 191, 192
 Jacobsen, N.E., 9, 10, 196
 Jansen, B.J., 8, 167, 206
 Janzen, K., 189
 Jean-Pierre, S., 195
 Jeffries, R., 2, 10, 196
 Jenkins, S.E., 96, 137, 192, 197
 John, B.E., 3, 9, 10, 16, 68, 129, 150, 157, 171, 174, 190, 196, 197
 Johnk, L.D., 2, 6, 189
 Johnsgard, T.J., 119, 120, 197
 Johnson, M., 74, 103, 105, 190
 Jones, K.S., 62, 194
 Jones, S., 3, 20, 97, 148, 192, 209
 Ju, P., 187
Kahn, M.G., 5, 192
 Kahn, M.J., 158, 197
 Kandogan, E., 62, 197
 Kanis, H., 9, 205
 Kantowitz, B.H., 195
 Karat, C-M., 2, 3, 10, 197
 Karat, J., 5, 192
 Karyukina, B., 200
 Keil, M., 5, 197
 Kendall, P., 57, 58, 210
 Kennedy, A., 20, 197
 Kennedy, J., 6, 195
 Keyes, E., 155, 197
 Kieras, D.E., 15, 189, 194, 197, 204
 Kilpatrick, C.E., 203
 Kim, H., 62, 197
 Kim, J., 61, 158, 197, 198
 Kincaid, J.P., 151, 198
 Kindlund, E., 200
 Kipping, G.J., 53, 193
 Kitajima, M., 189
 Klee, M., 54, 87, 207
 Kodimer, M.L., 119, 129, 208
 Kolers, P.A., 53, 192
 Komlodi, A., 204
 Kondziela, J., 10, 192
 Koonce, J.M., 20, 199
 Kosslyn, S.M., 46, 96, 139, 162, 198
 Koyani, S.J., 13, 16, 18, 36, 37, 39, 40, 41, 42, 46, 47, 54, 57, 59, 60, 61, 70, 72, 73, 75, 78, 81, 82, 84, 85, 86, 87, 89, 92, 121, 126, 131, 132, 145, 148, 149, 151, 152, 156, 157, 158, 161, 167, 169, 188, 198, 201
 Krull, R., 142, 150, 153, 198
 Kucera, H., 147, 198
 Kuchinsky, A., 16, 18, 135, 189
 Kulikowich, J.M., 52, 198
 Kurniawan, S.H., 98, 136, 193
Lafond, C., 13, 36, 39, 40, 41, 47, 57, 72, 87, 92, 121, 131, 145, 148, 156, 158, 161, 201
 Landauer, T.K., 7, 9, 169, 193, 194, 202
 Landay, J.A., 196
 Landesman, L., 7, 72, 135, 198, 203
 Larkin, J.H., 12, 191
 Larsen, L., 67, 188
 Larson, K., 84, 198
 Lawless, K.A., 52, 198
 LeBlanc, M., 210
 LeCompte, D.C., 20, 198
 Leech, G., 147, 198
 Leiser, D., 18, 162, 200
 Levine, R., 3, 14, 25, 31, 38, 40, 57, 76, 77, 85, 87, 90, 91, 94, 105, 106, 135, 137, 156, 165, 198
 Levy, E., 137, 142, 169, 198
 Lewenstein, M., 48, 107, 198
 Lewis, C., 101, 189, 198
 Lewis, E., 155, 197
 Lewis, J.R., 7, 198, 199
 Li, F.C., 196
 Liao, C.H., 98, 99, 189
 Lichty, T., 100, 199
 Lida, B., 189
 Lieberman, L.R., 142, 199
 Lim, R.W., 20, 94, 199
 Lin, J., 196
 Liu, D., 207
 Lloyd, C.J.C., 206

Lochbaum, C.C., 193
 Longo, K., 12, 20, 21, 28, 77, 98, 118, 124, 125, 145, 146, 158, 187
 Lorch, E.P., 75, 199
 Lorch, R.F., 75, 109, 199
 Lucas, H.C., 16, 188
 Lynch, P.J., 4, 8, 14, 16, 21, 36, 38, 43, 45, 46, 56, 58, 59, 67, 69, 74, 81, 149, 155, 199
Macbeth, S.A., 5, 199
 MacGregor, J.N., 20, 199
 Mackinlay, J.D., 210
 Maglio, P.P., 19, 68, 101, 131, 190
 Mahajan, R., 48, 72, 117, 199
 Mahke, S., 35, 199
 Manning, H., 206
 Marchionini, G., 56, 131, 135, 199, 204
 Marcus, A., 52, 100, 108, 116, 118, 119, 120, 127, 128, 129, 151, 199
 Marks, S.J., 3, 197
 Marshall, S., 47, 54, 72, 199
 Martin, G.L., 135, 199
 Mashyna, M.M., 10, 197
 Matessa, M., 190
 Matson, R., 25, 207
 Maurutto, P., 96, 201
 Mayer, K., 131, 207
 Mayer, R.E., 52, 75, 199
 Mayes, D.K., 20, 199
 Mayhew, D., 6, 28, 98, 104, 123, 148, 159, 199
 Mayhorn, C.B., 201
 McClintock, C., 210
 McClintock, A., 3, 188
 McConkie, G., 101, 200
 McDonald, S., 62, 200
 McDougall, S., 20, 192
 McEneaney, J.E., 20, 62, 200
 McGrew, J., 5, 200
 Meluson, A., 194, 195
 Meyer, B.J.F., 75, 200
 Meyer, J., 18, 162, 200, 207
 Miller, C.S., 84, 200
 Miller, D., 195, 200
 Miller, J.R., 196
 Miller, M.A., 6, 200
 Mills, J.A., 151, 200
 Mills, M., 98, 99, 188, 189
 Minnaert, G., 93, 191

Minuto, A., 194
 Mitchell, C.M., 75, 201
 Mobrand, K.A., 83, 84, 85, 86, 200
 Molich, R., 9, 200, 202
 Moran, T.P., 63, 97, 129, 190
 Moray, N., 17, 201
 Morkes, J., 42, 73, 75, 103, 148, 149, 152, 153, 157, 159, 201
 Moroney, W.F., 5, 199
 Morrell, R.W., 13, 23, 30, 75, 90, 111, 145, 201
 Morrison, J., 191
 Morville, P., 166, 205
 Mosier, J.N., 12, 18, 25, 53, 98, 103, 104, 105, 107, 112, 113, 114, 115, 117, 118, 122, 123, 124, 125, 129, 138, 139, 146, 147, 150, 153, 159, 160, 168, 206
 Moskel, S., 147, 201
 Muncher, E., 15, 204
 Muralidhar, A., 207
 Muraski, M., 210
 Murch, G.M., 25, 163, 201
 Murphy, E.D., 75, 201
 Muter, P., 96, 201
 Myers, B.A., 77, 201
Nadir, R., 51, 52, 97, 203
 Nall, J., 13, 18, 36, 39, 40, 41, 42, 47, 54, 57, 59, 61, 70, 72, 73, 75, 78, 81, 82, 84, 85, 86, 87, 89, 92, 121, 126, 131, 132, 145, 148, 149, 151, 152, 156, 157, 158, 161, 167, 169, 188, 198, 201
 Narveson, R., 109, 201
 Navai, M., 12, 201
 Nelson, D.L., 142, 201
 Neumann, F., 163, 195
 Neuwirth, C., 189
 Newell, A., 63, 97, 129, 190
 Nielsen, J., 3, 7, 9, 14, 16, 19, 24, 30, 33, 35, 36, 37, 38, 42, 43, 46, 47, 48, 56, 59, 62, 67, 68, 69, 73, 75, 76, 83, 84, 87, 88, 91, 92, 97, 103, 106, 107, 131, 132, 133, 135, 141, 145, 148, 149, 151, 152, 153, 155, 156, 157, 159, 165, 166, 167, 201, 202
 Niemela, M., 59, 158, 202
 Nolan, P., 143, 202
 Nordhielm, C.L., 131, 203

Norman, M., 5, 202
 Nygren, E., 47, 54, 101, 103, 104, 106, 158, 163, 202
Oel, W.V., 200
 Ojakaar, E., 167, 207
 Olson, J., 3, 191
 Omanson, R.C., 2, 4, 14, 15, 19, 38, 46, 47, 48, 58, 59, 62, 69, 74, 79, 87, 94, 103, 105, 106, 109, 131, 137, 155, 165, 192, 203
 Osborn, S., 5, 97, 131, 203
 Ouellette, J.P., 151, 191
 Ovaska, S., 5, 203
 Ozok, A.A., 97, 103, 203
Page, S.R., 16, 44, 45, 52, 76, 165, 174, 197
 Pagulayan, R.J., 138, 203
 Paivio, A., 142, 203
 Palermo, D.S., 150, 203
 Palmquist, M., 150, 151, 203, 210
 Park, I., 131, 203
 Parush, A., 51, 52, 97, 203
 Pastoor, S., 64, 68, 205
 Paterson, D.G., 53, 100, 134, 137, 147, 203, 208
 Payne, D.G., 195
 Peleg-Bruckner, Z., 3, 188
 Perfetti, C., 7, 135, 203
 Peterson, M., 189
 Pew, R.W., 112, 114, 125, 203
 Phipps, C., 93, 191
 Piolat, A., 64, 68, 204
 Pirolli, P., 86, 91, 191
 Pitkow, J., 86, 91, 191
 Plaisant, C., 13, 204
 Pollock, A., 166, 167, 204
 Polson, P.G., 15, 189, 194, 204
 Pons, A., 111, 208
 Post, T.A., 209
 Poulton, E.C., 100, 147, 204
 Powers, R., 46, 138, 139, 159, 204
 Preece, J., 135, 204
 Prickett, T., 75, 90, 148, 161, 210
Raiello, P., 9, 188
 Raiha, K.J., 5, 203
 Rajani, R., 3, 204
 Ramey, J.A., 3, 5, 10, 204
 Ramsay, J., 135, 204
 Rasamny, M., 194, 195
 Rayson, P., 147, 198
 Redish, J.C., 2, 9, 103, 105, 150, 155, 204
 Reed, V.S., 142, 201
 Reeder, R., 191
 Reeves, B., 131, 204
 Regli, S.H., 189, 210
 Rehe, R.F., 53, 100, 151, 204
 Rehman, A., 3, 204
 Remde, J.R., 2, 169, 193
 Remington, R.W., 84, 200
 Reynolds, L., 96, 137, 206
 Rickenberg, R., 131, 204
 Rigden, C., 25, 204
 Riley, S., 189
 Rodden, K., 142, 204
 Rogers, E.M., 190
 Rogers, T.B., 142, 203
 Rollins, A.M., 112, 114, 125, 203
 Rooden, M.J., 9, 205
 Rose, A.M., 103, 150, 155, 204
 Rosenberg, D., 3, 204
 Rosenfeld, L., 166, 205
 Roussey, J.Y., 64, 68, 204
Saarinen, J., 59, 158, 202
 Salaun, J., 194
 Sales, G., 52, 208
 Salvendy, G., 97, 103, 170, 193, 203
 Salzman, M.C., 7, 10, 195
 Sano, D., 3, 205
 Sarbaugh, L.E., 204
 Sawyer, P., 86, 91, 205
 Scanlon, S., 18, 205
 Scanlon, T., 207
 Scharff, L.F.V., 53, 96, 205, 210
 Schiano, D., 169, 198, 205
 Schmidt, L., 200
 Schneider, W., 97, 193, 205
 Scholtz, J., 10, 205
 Schraedley, P., 191
 Schramm, W., 148, 205
 Schriver, K.A., 157, 205
 Schroeder, W., 18, 54, 72, 86, 87, 91, 155, 167, 198, 205, 207
 Schultz, L.D., 75, 205
 Schwarz, E., 64, 68, 205
 Sears, A., 6, 135, 205
 Selvidge, P.R., 9, 135, 205, 206
 Seo, Y-W., 21, 210

Shamo, M., 162, 200
 Sharit, J., 15, 113, 117, 122, 129, 153, 192
 Sheridan, T.B., 17, 206
 Shiffrin, R.M., 97, 205
 Shinar, D., 18, 162, 200
 Shiveley, R.J., 195
 Shneiderman, B., xviii, 48, 62, 63, 72, 117, 135, 147, 196, 197, 199, 201, 206
 Shtub, A., 51, 52, 97, 203
 Sims, V.K., 20, 199
 Sinclair, D., 204
 Sinha, R.R., 3, 36, 54, 75, 87, 196, 206
 Slater, M.D., 57, 58, 190, 210
 Slaughter, S.L., 169, 196
 Smilovich, N., 52, 108, 116, 118, 119, 120, 127, 128, 129, 199
 Smith, E.E., 105, 206
 Smith, J.A., 15, 206
 Smith, S.L., 12, 18, 25, 53, 98, 103, 104, 105, 107, 112, 113, 114, 115, 117, 118, 122, 123, 124, 125, 129, 138, 139, 146, 147, 150, 153, 159, 160, 163, 168, 206
 Smith, W.J., 25, 207
 Smythe, P.C., 142, 203
 Snyder, C., 202, 207
 Snyder, H.L., 96, 206
 Sonderegger, P., 15, 206
 Sousa, A.P., 62, 192
 Souza, R.K., 206
 Spain, K., 87, 206
 Spencer, H., 96, 137, 206
 Spencer, R., 10, 206
 Spinillo, C.G., 131, 150, 206
 Spink, A., 8, 167, 206
 Spool, J.M., 4, 16, 38, 46, 50, 51, 54, 56, 57, 58, 68, 69, 79, 82, 83, 84, 86, 87, 88, 91, 92, 100, 131, 133, 134, 138, 141, 157, 165, 166, 167, 168, 207
 Spyridakis, J.H., 3, 20, 21, 43, 47, 48, 52, 57, 67, 68, 69, 72, 75, 76, 83, 84, 85, 86, 103, 106, 107, 109, 147, 148, 149, 150, 151, 152, 155, 156, 157, 158, 159, 160, 169, 196, 200, 205, 207
 Stagers, N., 51, 207
 Stanley, J.C., 10, 190
 Stanton, N.A., 9, 62, 207
 Steehouder, M., 2, 35, 41, 84, 109, 192
 Stevenage, S.V., 9, 207
 Stevens, K., 3, 207
 Stevenson, R.J., 62, 200
 Stewart, T.F.M., 158, 159, 160, 190, 207
 Sticht, T., 157, 207
 Stimart, R.P., 6, 200
 Stoffregen, T.A., 138, 203
 Stone, M., 169, 205
 Storrer, K., 189
 Strain, K., 198
 Suh, Y., 15, 206
 Sullivan, P., 157, 207
 Sullivan, T., 25, 207
 Sundar, S.S., 131, 207
 Sutcliffe, A., 101, 131, 140, 193, 194
 Swarts, H., 75, 103, 150, 194
 Sykes, D., 155, 197
Tahir, M., 3, 35, 36, 37, 38, 43, 47, 56, 59, 67, 76, 84, 87, 88, 91, 92, 106, 132, 135, 141, 145, 155, 156, 202
 Tan, K.C., 158, 197
 Tan, W-S., 2, 207
 Tatar, D., 198
 Taylor, R.G., 62, 207
 Terveen, L., 187
 Thomas, D.W., 163, 206
 Thomas, M., 198
 Thompson, L., 52, 108, 116, 118, 119, 120, 127, 128, 129, 199
 Thomsen, A.D., 200
 Thorell, L.G., 25, 207
 Thunin, O., 64, 68, 204
 Tiller, W.E., 16, 155, 207
 Tinker, M.A., 53, 98, 100, 134, 137, 147, 195, 203, 208
 Toms, E.G., 157, 208
 Tractinsky, N., 6, 208
 Treisman, A., 96, 101, 106, 208
 Trollip, S., 52, 208
 Trueman, M., 75, 195
 Tufte, E.R., 98, 138, 162, 208
 Tullis, T.S., 21, 25, 36, 38, 50, 51, 53, 58, 62, 81, 88, 97, 98, 99, 104, 111, 119, 129, 135, 139, 145, 148, 159, 160, 208
 Tversky, B., 198
 Tweedie, L.A., 62, 207

- Utting, K., 62, 209
 Uyeda, K.M., 196
 Van Der Wege, M., 191
 Vanderheiden, G., 24, 25, 27, 28, 74, 191, 192
 Vartabedian, A.G., 100, 147, 209
 Vaughan, M.W., 134, 209
 Virzi, R.A., 7, 209
 Vora, P., 5, 209
 Vosburgh, A.M., 194
 Voss, J.F., 52, 209
 Walker, P., 101, 198
 Wallace, F.L., 97, 187
 Wallace, V., 18, 122, 194
 Walling, J.R., 142, 201
 Watson, B., 142, 150, 153, 198
 Wehrle, N.S., 190
 Wen, C.Y., 133, 209
 Wharton, C., 196
 Whissell, C., 147, 209
 Wilkes, A., 20, 197
 Williams, T.R., 3, 50, 52, 57, 67, 73, 76, 96, 99, 100, 101, 133, 134, 142, 209
 Wilson, A., 147, 198
 Wilson, J.R., 4, 209
 Wilson, R.D., 197
 Wixon, D., 3, 209
 Wogalter, M.S., 94, 199
 Wolfmaier, T.G., 25, 210
 Wood, K., 204
 Wood, S.D., 5, 190
 Woodall, W.G., 190
 Woolrych, A., 9, 192
 Wright, P., 74, 104, 147, 150, 153, 155, 210
 Yankelovich, N., 62, 209
 Yantis, S., 101, 196
 Yoo, B., 47, 158, 198
 Youngman, M., 53, 210
 Yu, Y., 131, 132, 191
 Zacks, J., 198
 Zaphiris, P., 64, 210
 Zellweger, P.T., 65, 210
 Zeno, R.J., 197
 Zhang, B-T., 21, 210
 Ziegler, J.E., 15, 210
 Zimmerman, D.E., 5, 6, 57, 58, 72, 75, 90, 113, 126, 148, 150, 151, 155, 156, 157, 161, 190, 203, 210
 Zola, D., 101, 200

Index

A

- abbreviation, 145, 146
 above the fold, 132, 171
 to attract attention, 43
 access,
 to content or information, 87, 161
 to search, 164
 accessibility, 22-28, 98
 assistive technology and, 23, 26, 27
 automatic evaluation tools and, 10
 Section 508, 23
 accuracy
 of data entry, 110
 of headings, 74
 of scanning, 104
 of selecting links, 174
 acronym, 147
 use of on websites, 145
 action,
 control, 58
 of pushbuttons, 116, 128, 175
 of users, 42
 possible from a homepage, 36
 activate,
 radio buttons, 119
 the default action, 128
 the pushbutton, 175
 using a keyboard, 26
 active portion of the screen, 56
 active voice, 150, 171, 174
 activities performed by users, 17, 176
 advanced web interaction skills, 125
 advertisements, 101, 136
 aid, 174
 or usability specialists, xvii
 navigation, 174
 alignment,
 of page elements, 52
 alphabetical,
 as an organizational method for lists, 103, 107
 alt text, 24, 26, 134

- anchor link, 57, 171, 176
 animation, 131, 140
 as an attention-attracting feature, 101
 multimedia, 28
 text equivalents for, 24
 annotation
 of graphics, 138
 applet, 171
 accessibility of, 24, 27
 Java, 176
 arrows,
 as clickability cues, 81, 82, 172
 assistive technology, 23, 25, 26, 27, 28, 79, 171
 asterisk, 111, 114
 attention,
 attracting, 43, 70, 77, 82, 100, 101, 131, 147, 171
 user, 77, 129, 133, 139
 audience,
 for the *Guidelines*, xv, xvii, xix
 multiple, 161
 audio, 28, 131
 accessibility issues and, 24
 automatic,
 cursor placement, 124, 171
 error detection, 112
 tabbing, 125, 171
 time-out, 16
 usability evaluation, 10, 176
 auto-tab, 125, 171

B

- Back button, 46, 58, 63
 background, 31, 54, 96, 97,
 and methodology for the *Guidelines*, xx
 color, 25, 54, 96, 106, 158
 image, 137
 banner ad, 136, 171, 173
 bar,
 address, 171
 browser, 76, 174
 navigation, 18

- bar, (cont.)
 - scroll, 45, 54, 70, 132, 175
 - title, 97
- bar graph, 138, 162
- benefit,
 - for audiences of the *Guidelines*, xv, xvii
 - of text links, 83
- bias
 - tester, 9
- bold, 54, 70, 77, 100, 101, 111, 114, 147
- bookmark, 76
- boolean, 167
- brainstorming, 5
- breadcrumbs, 18, 56, 171, 174
- browser, 31, 58, 176
 - common, 30, 174
 - settings, 91, 98
- bullets,
 - clickability, 81, 82, 172
 - lists, 24, 104, 109
- button
 - Back, 46, 58, 63
 - radio, 23, 52, 108, 119, 121, 175, 176
- bytes, 16, 135
- C**
 - capitalization, 108, 147
 - caption, 28, 101
 - card sorting, xxii, 171
 - cascading menu, 93, 172
 - case,
 - sensitive, 124
 - upper-, 101, 147
 - upper- and lower-, 100, 124, 129, 147, 168
 - center,
 - of the Web page, 48, 54, 81, 82, 152, 157, 171
 - characters,
 - limit for in text field, 117
 - per line, 53,
 - spacing of, 97
 - which require the use of the Shift key, 129
 - check box, 52, 108, 119, 120, 172
 - clicks,
 - double, 126
 - reducing user, 121, 156
 - clickability cue, 59, 61, 81, 82, 83, 94, 143, 172
 - "click here", 84
 - client-side, 26, 172, 176
 - code,
 - color, 56, 163
 - HTML, 8
 - user-entered, 124
 - zip, 123
 - cognitive walkthrough, 10, 172
 - color, 6, 25, 31, 56, 94, 97, 101, 135, 163
 - accessibility issues and, 25
 - background, 54, 97, 106, 158
 - for grouping, 106, 158, 163
 - of links, 18, 56, 81, 82, 83, 88, 172
 - to gain attention, 101
 - column,
 - alignment, 52
 - headings, 74
 - width, 53
 - computer,
 - capabilities/strengths, 17, 112, 113, 139
 - error detection by, 112, 139
 - human-computer interaction, xx, 11
 - speed/processing time, 6, 18, 135
 - connection speed, 6, 19, 33, 172
 - consistency
 - of alignment, 52
 - of clickability cues, 81
 - of formatting, 98
 - of labels, 117
 - of link names and targets, 85
 - of important items, 49, 59, 131
 - of titles, 76
 - physical, 174
 - visual, 97
 - content, 2, 3, 4, 6, 13, 26, 48, 51, 89, 131, 140, 172
 - accessing important, 87
 - length of pages for, 45, 69
 - meta-, 8

- content, (cont.)
 - organization of, 154-163
 - writing Web content, 144-153
- content page, 145, 172
 - structuring to facilitate scanning, 157
- contents,
 - clickable list of page contents, 57
 - table of, 62, 173
 - See also Anchor link and Within-page links*
- contrast,
 - high-contrast backgrounds, 96
 - lightness, 25
- control,
 - of animation, 140
 - of link wrapping, 91
 - of page layout, 28
 - screen-based, 110-129
 - See also Widgets*
- cue,
 - clickability, 59, 61, 81, 82, 83, 94, 143, 172
- D**
 - data
 - comparison of, 50
 - critical, highlighting of, 77
 - display of, 117, 138, 139, 162
 - formatting, 12
 - re-entry of, 113
 - tables of, 74, 160
 - user-entered codes and, 124
 - data entry, 52, 111, 124, 172
 - accuracy of, 110
 - fields, labels for, 114, 115, 117, 125
 - indicating required vs. optional fields, 111
 - reducing errors during, 123
 - speed of, 118, 122, 125, 129
 - user, 113, 117, 122, 123, 124, 129
 - errors with, 112, 113, 123, 125, 129
 - minimize, 113
 - dead-end pages, 55
 - default,
 - action, 128
 - browser, 31
 - link colors, 88
 - selection, radio buttons, 119
 - value, 118
- delay,
 - user tolerance for, 68, 135
- density,
 - page/screen, 51, 172
- design
 - iterative, 2
 - parallel, 5
- destination page, 56, 60, 172
 - matching link names with, 85
- disabilities,
 - number of people with, 23
 - See also Accessibility, Assistive technology, and Section 508*
- document,
 - lengthy, 14, 69
- double-click, 126
- download,
 - convenience related to, 45
 - time for, xxii, 16, 19, 83, 131, 133, 135, 137, 172
- E**
 - entry field, 117, 124, 129, 172
 - labels for, 114, 115, 123, 125, 129
 - required vs. optional, 111
 - errors,
 - automatic detection of, 112
 - increasing the possibility of, 113, 129
 - reducing the number of, 60, 93, 97, 123, 125, 127, 129
 - ethnographic evaluation, xxii
 - evaluation
 - automatic, 10
 - heuristic, 9, 173
 - of website designs, 3
 - tester bias during, 9
 - evidence
 - strength of, xvi, xvii, xix, xxi-xxii,
 - expert evaluation, 172
 - See also Heuristic review*
 - expert opinion, xv, xix, xxi, xxii

expert review, 7, 9, 173

See also Heuristic review

eye-tracking, 48

F

feature,

attention attracting, 101

feedback,

providing to orient users, 56, 88

providing while users wait, 18,

field,

data entry, indicating required, 111

data entry, labeling, 114, 115, 117

data entry, partitioning, 123

data entry, placing cursor in, 124

fold, 173

above the, 43, 132, 171

below the, 43, 45, 132, 173

impact on homepage design, 43

limit large images above, 132

font,

attracting attention with, 101

emphasizing importance with, 100

size and reading speed, 98

style and reading speed, 99

sans serif, 99, 100

serif, 99, 100

form(s),

assistive technologies and, 23

designing entry fields for, 111, 114-115, 117, 123

displaying default values in, 118

making user friendly, 112-113, 122, 124-125, 129

widgets and, 116, 119-121, 126-128

working memory limitations and, 20

frame(s), 173

accessibility issues and, 24, 27

appropriate use of, 46, 63

title, 27

G

gloss, 173

assisting navigation with, 65

graphics, decorative, 6, 81, 101, 133, 136

H

heading, 73-79, 85, 173

impact on scrolling, 54, 70, 157

introducing lists with, 105

placing on the page, 59

providing feedback with, 54

help, user, 13

heuristic evaluation, 9, 173

hierarchy,

information, placement of critical

items in, 156

information, showing with site maps, 62

information, use of html headers and, 79

high speed access, percent of users with, 33

high-contrast backgrounds, reading

performance and, 96

homepage,

announce changes to website on, 40

characteristics of, 36

communicating website purpose on, 41

conveying quality with, 35

enabling access to from all other

pages, 38

length of, 43, 45

panels, 39

presenting options on, 37

prose text on, 42

horizontal scrolling, 67

hourglass, use of to indicate waiting

times, 18

HTML order, headings and, 79

I

IBM, 38, 43, 56, 196

IEEE, 84, 196

image, 171, 175

accessibility issues and, 24

appropriate use of, 133

attracting attention with, 101

background, 96, 137

conveying messages with, 141

decorative, 6, 81, 101, 133, 136

image, (cont.)

facilitating learning with, 142

full-size, 135

labeling of, 134

link, 83, 134, 143

thumbnail, 135, 176

image map, 173

accessibility issues and, 26

clarifying clickable regions of, 94

important items, placement of, 48, 49

index link, 173

information,

facilitating user performance of, 12,

115, 155, 156, 158-163

hierarchy, html headings and, 79

quantitative, format of, 162

supportive, 90

information-based website, xix

instructions, writing of, 150

italics,

attracting attention with, 101

emphasizing text with, 100

iterative design process, 2, 3

J

jargon,

avoiding the use of, 148

providing links to explain or define, 90

Jupitermedia Corporation, 30, 32, 33, 197

K

keyboard, entry speed and, 122

keyword, 173

L

label,

category, 72

data entry field, 114-115, 117, 125

link, 38, 72, 84

list, formatting of, 106

tab, 60

widget, 108, 116, 119, 120

layout,

page, horizontal scrolling and, 67

page, importance to finding

information, 47

page, structuring for data comparison, 50

learning, using images to facilitate, 142

letter,

first, capitalization of in lists, 108

case of, use in codes, 124

case of, use in mixed prose, 147

case of, use in search terms, 168

uppercase, attracting attention with, 101

line length, reading speed and, 53

link

anchor, use of on long pages, 57

blue, 81, 82, 88

clickability cues for, 81

embedded text, designing, 86

importance in site being found by search engines, 8

index, definition of, 173

internal vs. external, indicating, 92

missing, detection by automated evaluation methods, 10

navigation, assistive technology

skipping of, 26

navigation, effects of prose text on, 152

placement on the homepage, 36, 37

placement denoting importance, 47

repeating, 87

to information for new users, 4

to complete printable/downloadable documents, 14

to homepage, labeling of, 38

to related content, 89

to supporting information, 90

used, color for, 88

visual characteristics of, 82

link, image,

cautions emulate on use, 83

importance of labels with, 134

real-world objects, 143

link label,

make specific and descriptive, 72

text, appropriate length of, 91

use the user's terms in, 84

- link text,
 - matching to destination page heading, 56, 85
 - reasons for use, 83
 - redundant use with image maps, 26
- list,
 - alignment of elements to maximize performance, 52
 - bulleted, when to use, 109
 - drop-down, performance compared to radio buttons, 119
 - drop-down, use compared to open list, 127
 - format, capitalization, 108
 - format, ease scanning, 106
 - format, place important items at top, 107
 - headings, use of, 105
 - horizontal, cautions for using 104
 - numbered, when to use, 109
 - order to facilitate user performance, 103
 - placement for differentiation, 59
 - pull-down, use compared to open list, 127
 - vertical, displaying items in, 104
- list box,
 - entry speed compared to data entry box, 129
 - showing options in, 126
- list of contents, use of on long pages, 57
- logo,
 - use as link to homepage, 38
 - placing on each page, 131
- lowercase,
 - use in user-entered codes, 124, 129
 - use in prose text, 147
 - use in search terms, 168
- m**
 - masthead, use of to designate homepage, 36
 - mental representation, effects of paging on user's ability to create, 68
- menu,
 - cascading, selection of items from, 93
 - formatting to provide user feedback, 56
 - sequential, when to use, 63
 - simultaneous, use of frames with, 46, 63
- minesweeping,
 - using to determine clickability, 81, 83
- mixed case, use in prose text, 147
- monitor,
 - flicker frequency and accessibility, 28
 - reading from and multitasking, 20
- monitor/screen resolution, 43, 91, 173, 175
 - horizontal scrolling and, 67
 - impacts on design, 33
 - impacts on font size, 98
- mouseover,
 - accessibility issues with, 26
 - compared to 'pointing and clicking', 93
- multimedia,
 - synchronize equivalent alternatives to ensure accessibility, 28,
 - appropriate use of, 131,
 - introductory explanations of, 140
- n**
 - National Cancer Institute, xv, xvi, xviii, xx
- navigation,
 - dead-end pages and, 58
 - glosses and, 65
 - importance of in meeting user expectations, 4
- navigation elements,
 - differentiation and grouping of, 59, 158
 - placement of, 48, 58, 64, 83
- navigation links,
 - allowing assistive technologies to skip, 26
 - placement in frames and accessibility issues, 27, 152
- navigation pages,
 - design of, 45, 48, 64, 152
 - scrolling and, 64

- navigation schemes, use and benefits of, 59
- navigation tab,
 - formatting of, 61, 143
 - placement of, 49, 54,
- numbers,
 - partitioning of for data entry, 123
- O**
 - open list, 119, 126, 127, 174
 - performance compared to radio buttons, 119
 - showing options in, 126
 - use compared to drop-down/pull-down list, 127
 - operating systems, designing for different, 32
 - options,
 - presenting on the homepage, 37
 - reducing number of, 78
- P**
 - page
 - length, appropriate, 45
 - loading and byte size, 16
 - loading and scrolling, 68
 - navigation, 48, 64, 152
 - scrolling and reading comprehension, 68
 - text-only and accessibility, 25
 - titles, 76
 - titles and role in being found by search engines, 8
 - page layout,
 - designing for data comparison, 50
 - horizontal scrolling and, 67
 - level of importance and, 47
 - placement of important items, 48
 - paging,
 - and reading comprehension, 68
 - versus scrolling, 68
 - panel,
 - width on the homepage, 39
 - location of links in, 59, 81
 - use with frames, 63
 - participants, number for usability testing, 7
 - partitioning, long data items, 123
 - passive voice, 150, 174
 - path, 56, 174
 - performance,
 - benchmarks, 2
 - goal/objective, 6, 174
 - performance test, 7, 174
 - user bias in, 9
 - picture,
 - alt text and, 24
 - facilitating learning and, 142
 - pixel,
 - dimension tags, 135
 - number, and impact on page design, 33
 - number, and impact on screenful size, 43
 - size, and impact on font size, 98
 - plug-in, 174, 176
 - accessibility and, 27
 - point-and-click, 93, 174
 - pop-up window, 173, 174
 - glosses, and, 65
 - user performance, and 13
 - preference,
 - objectives, 174
 - user, and design considerations, 6
 - user, and font type, 99
 - presentation, 175, 176
 - multimedia, accessibility and, 28
 - prose text, 172, 175
 - emphasizing importance of, 100
 - formatting of, 96
 - impact of scanning on, 152
 - limiting on the homepage, 42
 - limiting on navigation pages, 152
 - mixed case and, 147
 - readability of, 151
 - scanning and embedded text link lengths, 91
 - scanning issues and, 157
 - scrolling issues and, 70
 - prototype, use in the design process, 2, 176
 - pushbutton, 175
 - design of, 97, 143, 116
 - prioritization, 128

R

radio button, 175, 176
 appropriate use of, 119
 assistive technologies and, 23
 capitalization of labels, 108
 reading comprehension, impacts on, 68, 151
 reading performance,
 font size and, 98
 multitasking and, 20
 performance and page layout, 96, 98
 reading speed,
 font type and, 99
 impact of font characteristics on, 100
 impacts of line length on, 53
 impacts of multitasking on, 20
 redesign, announce changes before, 40
 related content, linking to, 89
 related information, grouping to enhance user performance, 158
 relative importance, xv, xvi, xvii, xviii, xix, xx, xxi, 23, 24, 101
 requirements,
 user, establishing and understanding, 5
 user, and tailoring online display of information, 159
 research-based evidence, xxi, xxii
 resolution,
 design considerations and, 33
 horizontal scrolling and, 67
 impact on font size, 98
 screen, impact on homepage, 43
 reveals, use of to attract attention, 101, 175
 row,
 alignment of, 52
 headers and headings, 74, 160

S

scanning, 175
 accuracy, 104
 facilitating, 157
 importance of color, 163
 importance of headings, 75, 84
 lists and, 104, 106, 107
 page layout/structure and, 50, 51, 52
 performance, importance of grouping to, 158
 prose text on the homepage and, 42, 152
 text link lengths and, 91
 screen, 171, 172, 173, 174, 175, 176
 browser, 27, 76
 density, 51
 flicker, 28
 locating items on, 48, 49
 real estate, widget selection and, 121, 126, 127
 resolution, 33, 43, 91, 173, 175
 screen reader, facilitating use of, 25, 26, 74, 124, 175
 screenful, 171, 175, 176
 content page design and, 69
 homepage length and, 43
 large images and, 132
 navigation page length and, 64
 script, 172, 176
 accessibility issues and, 24, 26
 scroll bar, 70, 132, 175
 scroll box, 70
 scroll stopper, 54, 175
 scrolling, 171, 173, 174, 175
 data entry fields and, 117
 facilitating, 70
 horizontal, 67
 impact on homepage design, 43
 keeping functions available during, 46
 lists, 107, 126, 127
 navigation pages and, 64
 page length decisions and, 45
 reading comprehension and, 68
 scroll stoppers and, 54
 searching for information and, 69
 versus paging, 68
 search engine/function,
 advanced, 167
 cautions when using, 165
 functionality of, 167, 168, 169
 page titles and, 76

search engine/function, (cont.)
 placing on each page, 165
 placing on homepage, 36
 registration with, 8
 results, making usable, 166
 template, design and use of, 170
 terms used in, 166, 167, 168, 169
 search sequences, standardizing, 15
 Section 508, 23, 175
 sentence(s), 172, 175, 176
 descriptive, 149
 impact of on scanning, 157
 reading comprehension and, 151
 use of voice in, 150
 sequential menu, 63, 175
 server-side image map, 26, 172, 176
 shift key, 129
 signal, auditory, 18
 simultaneous menu, 176
 use of frames with, 46
 versus sequential menus, 63
 site map, 173, 176
 link to, placing consistently, 59
 link to, on homepage, 36
 use of, 62
 software, 171, 174, 175
 use of in the design process, 2, 10,
 accessibility issues and, 27, 124
 sound, accessibility issues and, 24
 source documents, xvi
 speed
 connection, definition of, 172
 connection, and design issues, 6, 33
 connection, and download times, 19, 172
 strength of evidence, xvi, xvii, xviii, xix, xxi
 style sheet, 176
 accessibility issues and, 28
 survey, xxii
 customer, establishing user requirements and, 5
 use in creating lists of user terms, 147

T

tab, 176
 design and placement, 59, 61
 labels, 60
 ordering, 103
 table,
 quantitative information and, 162
 row and column headings, 74
 scrolling issues and, 160
 tag,
 html heading, 79
 pixel dimension, 135
 tagline, 36, 41, 176
 target page, 176
 matching link names with, 85
 task(s),
 appropriate menu types for, 63
 completion times and visual consistency, 97
 ordering/sequencing to maximize user performance, 103, 153
 sequence, standardization of, 15
 task analysis, 159, 176
 importance in meeting user expectations, 4
 test subjects, correct number of, 7
 tester bias, 9
 testing results, use of, 10
 website, common browsers and, 30
 website, common screen resolutions and, 33
 website, operating systems and, 32
 text, 172, 175
 alignment of, 52
 alternatives for image maps and accessibility, 26
 blocks of, 52, 54, 100
 blue, 81, 82, 88
 continuous, 104, 172, 175
 formatting for emphasis, 100, 101
 formatting for reading performance, 96, 98
 grouping with color, 158

text box, 117, 173
 accessibility issues and, 23
 text equivalents, accessibility issues and, 24
 text label
 clickable images and, 134, 143
 text link,
 appropriate length of, 91
 benefits of, 83
 embedded, 86
 image maps and, 26
 indicating used, 88
 matching to destination page title, 85
 use of compared to image links, 83
 text only pages, accessibility issues and, 24
 thumbnail image, 135, 176
 time out, 16, 176
 title(s), xvi,
 abbreviating, 146
 frame, accessibility issues and, 27
 link, 42
 page, 8, 76, 174
 page, and link text consistency, 85, 174
 tool(s), xviii
 automatic evaluation, role in the design process, 10
 software, development of prototypes and, 2
 transactions, data entry, 122, 129

U
 underlining,
 attracting attention with, 101
 clickability cues and, 81, 82, 100, 172
 emphasizing importance with, 100
 highlighting critical data and, 77,
 uppercase,
 attracting attention with, 101
 use in prose text, 147
 use with search engines, 124, 129, 168
 URL, 176
 indicating destination of links with, 92
 providing feedback to users with, 56

usability, xv, xvi, xvii, xviii, xix, xx, xxi, xxii
 problem, 9, 173
 role of 'before and after' studies in determining, 3
 specialist, xvi, xvii, xx, 7
 study, role in the design process, 3
 usability goal, 6
 role in the design process, 2
 usability test(ing), xviii, xx, xxii, 176
 automatic evaluation and, 10
 bias in, 9
 cognitive walkthroughs and, 10
 determining user information needs with, 159, 163
 expert evaluations and, 9
 heuristic evaluations and, 9
 performance/preference goals and, 6
 role in designing headings and labels, 73, 114
 role in the design process, 6
 test subjects and, 7
 widgets and, 121
 user(s),
 acceptance of website, text line length and, 53
 attention, drawing with highlighting, 77
 color deficient, designing for, 25
 disabilities, designing for, 22-28, 79
 expectations, designing to meet, 4
 experienced/frequent, designing for, 49, 125
 groups, role in establishing user requirements, 5
 inexperienced/new, importance of clickability cues to, 81
 inexperienced/new, paging and, 68
 inexperienced/new, providing assistance to, 13
 inexperienced/new, search functions and, 167
 interface issues, 6
 multitasking, reading performance impacts of, 20
 older, importance of descriptive headings to, 75

user(s), (cont.)
 older, scrolling behavior of, 69, 75
 older, widgets and, 121
 performance, design considerations and, 6, 103, 110
 requirements, 5
 terminology, using in help documentation, 18
 visually impaired, 31
 working memory limitations, designing for, 20, 46
 workload, reducing, 17
 younger, scrolling behavior of, 69

U
 video,
 accessibility issues and, 24
 meaningful use of, 131
 user control of, 140
 vision-related disabilities, 23
 visual
 consistency, importance of, 97
 design, importance of, 3
 visual cues,
 designating required data entry fields with, 114
 providing user feedback with, 56
 visualization techniques and quantitative information, 162
 visually-impaired users, 31
 vocabulary, user, designing search terms around, 169
 voice,
 active, 150, 171
 negative, 150
 passive, 150, 174

W
 walkthrough, cognitive, 10, 172
 Web page,
 attention attracting features on, 101
 layout, consistent alignment of items on, 52
 layout, facilitating scrolling, 70
 layout, style sheets and accessibility issues, 28
 layout, white space and, 51
 length, primary use and, 45
 positioning important items on, 48
 printing options for, 14
 titles, 76
 visual consistency of, 97
 website,
 accessibility issues and, 22-28
 attention attracting features, 101
 designing to be found by search engines, 8
 format, meeting user expectations for, 4
 goal, importance in design process, 2
 hierarchy, place critical information high in the, 156
 information, format for multiple audiences, 161
 purpose, communicating, 41
 redesign, announcing changes to users, 40
 use of and help documentation, 18
 visual consistency across, 97
 white space,
 appropriate application of, 51
 use of in lists, 106
 widget, 176
 alignment of, 52
 capitalization of labels, 108
 check box, 172
 appropriate use of, 120
 displaying default values in, 118
 drop-down list,
 appropriate use of, 121, 127
 entry field,
 distinguishing required and optional, 111
 labeling, 114, 115, 125
 partitioning of, 123
 placing cursor in, 124
 list box,
 entry speed compared to data entry box, 129
 showing options in, 126

- widget, (cont.)
 - pushbutton, 175
 - labeling of, 116
 - prioritizing, 128
 - radio button, 175, 176
 - appropriate use of, 119
 - assistive technologies and, 23
 - visual consistency and, 97
- width,
 - homepage panels, 39
 - page, printing issues, 21
 - pixel dimension tags for images, 135
 - screen, maximum dimensions, 43
- window, unsolicited, 13
- within-page links, 57, 176
- working memory, 20, 46, 160

About the Authors

Sanjay J. Koyani is a Senior Usability Engineer in the Communications Technology Branch of the National Cancer Institute. He has a M.P.H. degree in Public Health from University of Tennessee. Mr. Koyani has directed usability research, implemented usability best practices, and developed usability tools like Usability.gov for the past four years. He facilitated the development of the guidelines by generating early concepts, directing the Guidelines Team, and participating in researching, reading, reviewing, and editing the guidelines.

Dr. Robert W. Bailey is the President of Computer Psychology, Inc. He has a Ph.D. degree in Human Performance Psychology from Rice University, and has been involved with usability for over 35 years. Previously, he worked at Bell Laboratories and taught at Columbia University. Dr. Bailey conducted the literature review that formed the foundation for the guidelines, translated most of the research results into meaningful guidelines, and created the rating scales.

Janice R. Nall is the Chief of the Communications Technology Branch of the National Cancer Institute. She has a M.B.A degree with a specialization in marketing, and a Bachelor of Arts in Psychology from the University of West Florida. Ms. Nall created the first usability group and usability laboratory in the Department of Health and Human Services. She had the original idea for the research-based guidelines project, participated in planning, periodic reviews and final preparation of this guidelines report.

Conrad Mulligan is a Senior Analyst at McNeil Technologies, Inc. He holds an M.S.c degree from the London School of Economics. Mr. Mulligan was the project manager and coordinated the project schedule and data collection activities. In addition, he reviewed and edited many of the guidelines to help make them more understandable, developed the glossary, and was responsible for finding most of the graphical examples.

Susan Allison is a Usability Engineer in the Communication Technologies Branch at the National Cancer Institute. She has a Master's degree from the University of Alabama and has been developing websites for six years. Ms. Allison enhanced the readability and accuracy of the guidelines by conducting several reviews, and editing and re-writing virtually all of the guidelines. In addition, she contributed to the logic of the rating process and identified many graphical examples.

Kent Bailey is the owner of Mind Design Systems. He has a MBA degree from the University of Utah. Mr. Bailey applied his extensive programming skills to creating and maintaining the guidelines database. In addition, he created all of the electronic data collection forms, coordinated the collection and organization of the ratings data, edited many guidelines, and developed the index.

Mark Tolson is a Senior Usability Engineer in the Communication Technologies Branch of the National Cancer Institute. He has a Bachelor's degree in Studio Arts from Florida State University. He developed and maintains the Usability.gov website. Mr. Tolson created the overall 'look and feel' of this book, and compiled, edited and organized the graphic examples. He also provided the Guidelines Team with the 'Mac' view of designing websites.

